UNITED STATES DISTRICT COURT

EASTERN DISTRICT OF NEW YORK

----------X

BRAINWAVE SCIENCE, INC.

Plaintiff

Letter Motion from Defendant Dr. Lawrence A. Farwell requesting the Court to modify its preliminary injunction.

- against -

Civil Action No.: 21-cv-4402 (BMC-RLM)

ARSHEE, INC., DR. LAWRENCE A. FARWELL, DR. THIERRY MAISON and BRAIN FINGERPRINTING FOUNDATION

Defendants.

---------- X

Honorable Brian M. Cogan
United States District Court Judge
U.S. Eastern District, New York

Dear Judge Cogan: December 31, 2022

This Letter Motion is for the purpose of requesting this Court to modify its Preliminary Injunction (EFS #30).

The Preliminary Injunction stated: "For the purposes of this preliminary injunction, 'confidential or proprietary information' is defined as any portion of the program plaintiff originally submitted to Codequiry as its code."

This Court's Order of August 21, 2022 stated: "Once discovery is complete, the Court will consider a motion to modify its preliminary injunction based on evidence demonstrating that large portions of the code submitted to Codequiry is, in fact, publicly available."

There is now definitive evidence demonstrating that large portions of the code submitted to Codequiry is, in fact, publicly available.

Even the Plaintiff now acknowledges that that large portions of the code submitted to Codequiry is, in fact, publicly available. In a Statement of Undisputed Material Facts (EFS 106-1), Plaintiff stated: "Approximately 90% of the source code developed by Maison for Brainwave is 'open source.'(Tomkins Affirmation, Exhibit A, 37:9-37:12)."

Dr. Farwell's 12/27/2022 Affidavit contained extensive evidence demonstrating that large portions of the code submitted to Codequiry is, in fact, publicly available. Exhibit EAA contains the most relevant excerpts from the same.

Exhibit EAB contains additional evidence demonstrating that large portions of the code submitted to Codequiry is, in fact, publicly available.

One of many examples in Exhibit EAA is the following. Dr. Farwell appeared in numerous online demonstrations before Brainwave was founded in 2012 wherein he demonstrated the Farwell Brain Fingerprinting 3.0 and 4.0 systems showing user interfaces for both of the functions of the system – brainwave measurement and brainwave analysis – that are virtually identical to the user interfaces represented by Brainwave as Brainwave's Trade Secrets in Plaintiff's CEO Ika's Affidavit of November 1, 2021 (EFS 20-2) and Exhibits B and D thereto. These two respective user interfaces – which are identical in the pre-existing Dr. Farwell software and Brainwave's– display all of the data, measurements, computations, results, algorithms, solutions, information, brainwaves, statistics, and everything of substance in the respective Dr. Farwell and Brainwave programs, derived from identical measurements and computations. All of the above are virtually identical in Dr. Farwell's pre-existing Farwell Brain Fingerprinting 3.0 and 4.0 programs and the program submitted to Codequiry that Brainwave claims contain its trade secrets.

In light of the above facts, the undersigned respectfully requests that the Preliminary Injunction be modified as follows:

Replace: "For the purposes of this preliminary injunction, 'confidential or proprietary information' is defined as any portion of the program plaintiff originally submitted to Codequiry as its code."

With: "For the purposes of this preliminary injunction, 'confidential or proprietary information' is defined as the code developed by Dr. Maison for Brainwave, except what is publicly available, open source, or public domain."

Dr. Farwell's 12/27/2022 Affidavit and Exhibit EAA also contain evidence regarding what was contained in "the program plaintiff originally submitted to Codequiry as its code" and the screenshots of user interfaces included in Plaintiff's CEO Ika's Affidavit of November 1, 2021 (EFS 20-2) and Exhibits B and D thereto.

The relevant facts contained in said evidence are as follows:

a. The foundation of Plaintiff's case in this lawsuit is a comparison between two sets of software code with respect to user interfaces and comparison in Codequiry.

b. One set of code is "Farwell Brain Fingerprinting 5.0" / "Dr. Maison BWS Software," "Neurodyne," the code developed by Dr. Maison and conveyed to Dr. Farwell, (available in Dr. Maison TFS), referred to in Plaintiff's documents as "Dr. Larry Farwell's Application" (EFS #20, #20-2, and Exhibits B, C, and D). An examination of Dr. Maison TFS will show, presumably, that this is in fact what Plaintiff Brainwave Science (BWS) represented it to be.

c. The other set of code Plaintiff represented as Dr. Maison BWS Software, aka "iCognative" (Brainwave Science TFS), the version of the software developed by Dr. Maison for BWS **before BWS obtained a copy of "Farwell Brain Fingerprinting 5.0" / "Neurodyne" / "Dr. Larry Farwell's Application" from Dr. Maison** on June 29, 2021.

d. In fact, an examination of the relevant evidence now before this Court in BWS TFS will show that the second set of software that BWS submitted for the comparison was NOT the software described in ¶ c above that BWS represented it to be. Rather, it was "BWS Fraudulently Modified Software," (BWS TFS) which BWS also called "iCognative" (BWS TFS). This is the version of the software that BWS modified to make it appear more similar to "Dr. Larry Farwell's Application" **after BWS obtained a copy of "Dr. Larry Farwell's Application" / "Farwell Brain Fingerprinting 5.0" / "Neurodyne" from Dr. Maison** on June 29, 2021. (BWS TFS).

e. **The most obvious and easily detectable modification that BWS made to the Dr. Maison BWS Software in creating the BWS Fraudulently Modified Software was changing the background color of the user interface from blue to green.** The revision histories and different versions of the two software programs, which are now in evidence before this Court (in BWS TFS, Dr. Maison TFS), will reveal what other changes BWS made in order to make the BWS Fraudulently Modified Software more similar to Dr. Larry Farwell's Application than Dr. Maison BWS Software is to Dr. Larry Farwell's Application.

The above facts (a.) – (c.) are undisputed. Plaintiff has neither admitted nor denied the above facts (d.) and (e.).

This Court has not yet ruled on facts (d.) and (e.).

Considerable evidence for facts (d.) and (e.) is contained in Dr. Farwell's 12/27/2022 Affidavit and Exhibits EAA and EAB hereto.

It is undisputed that Brainwave received a copy of Dr. Larry Farwell's Application on June 29,2021.

If the following is factual:

i. Brainwave subsequently modified the code as specified in (d.) above, and submitted the modified code to Codequiry and presented it in the screenshots presented in Ika's Affidavit of November 1, 2021 (EFS 20-2) and Exhibits B and D thereto;
ii. Said modifications incorporated features of Dr. Larry Farwell's Application that Brainwave received from Dr. Maison; and
iii. Said modifications made the modified code appear more similar to Dr. Larry Farwell's Application than the original, unmodified version that BWS falsely represented was submitted to Codequiry and represented in said screenshots;

Then:

"The program plaintiff originally submitted to Codequiry as its code" and said screenshots clearly included information that was not Brainwave's "proprietary and confidential information," but rather came from Dr. Larry Farwell's Application.

There is considerable evidence that the above (i.) – (iii) are factual in Dr. Farwell's 12/27/2022 Affidavit and Exhibits EAA and EAB. To eliminate the possibility of false information being included in Brainwave's "confidential or proprietary information," a further modification of the Preliminary injunction is required.

In light of the above evidence, the undersigned respectfully requests that the Preliminary Injunction be modified by adding the following after the modified section requested above:

"Modifications to the code developed by Dr. Maison for Brainwave, if any, made by Brainwave after Brainwave received 'Dr. Larry Farwell's Application' from Dr. Maison on June 29, 2021, comprising user interfaces modified to appear more similar to Dr. Larry Farwell's Application, and the code that generated what was displayed on said user interfaces, are not Brainwave's 'confidential or proprietary information.'"

Note that if Plaintiff denies have made the modifications to make the software in question appear more similar to Dr. Larry Farwell's Application after receiving a copy of Dr. Larry Farwell's Application from Dr. Maison on June 29, 2021, then Plaintiff has no reason to object to the above modification in the Preliminary Injunction. This is because the inclusion of the phrase "if any" ensures that if Brainwave made no such modifications, the added phrase has no impact.

Since there is substantial evidence that Brainwave modified the software as stated in (d.), (e.), (i.) - (iii) above, clearly it must be stated in the Preliminary Injunction that such modifications do not constitute Brainwave's "confidential and proprietary information." If said modifications to the Brainwave software took place, this is a critical and necessary modification to the Preliminary Injunction. If not, then it makes no difference and does no harm.

In summary, the undersigned respectfully requests that the Court modify the Preliminary Injunction to incorporate the two modifications stated above.

Sincerely,

Lawrence A. Farwell

Dr. Lawrence A. Farwell

Defendant

Exhibit EAA

Excerpts from Dr. Farwell's 2022-12-27 Affidavit Providing evidence demonstrating that large portions of the code submitted to Codequiry is, in fact, publicly available.

1. This document refers to six software programs that are now before this Court as evidence in this case, cited along with the source where the evidence is located.
2. Dr. Larry Farwell's Application is located in two places. Dr. Larry Farwell's Application is integrated into the Visual Studio /Microsoft .NET framework is located on Dr. Maison's TFS/ DevOps, to which Dr. Farwell no longer has access (Dr. Maison TFS). This is provided to Mindfire by Dr. Maison granting access to his TFS to Mindfire, which Dr. Farwell has requested. Dr. Larry Farwell's Application that is not integrated into said environment is in a folder transmitted by Dr. Farwell to Mindfire by uploading to Dropbox and providing Mindfire with the link ("Dr. Farwell Dropbox"). Note that this is "Confidential Information" of Dr. Farwell per the Consulting Agreement with Mindfire, and consequently neither BWS not anyone else other than Mindfire is given access.
3. The six software programs now before this Court as evidence in this case are as follows.
    a. Farwell Brain Fingerprinting 3.0 (Dr. Farwell Dropbox) is a version of Dr. Farwell's Brain Fingerprinting software developed by Dr. Farwell in the early 1990s that Dr. Farwell applied at the FBI, the CIA, the US Navy, and in scientific research, scientific publications, and field applications in criminal investigations and counterterrorism operations around the world.
    b. Farwell Brain Fingerprinting 4.0 (Dr. Farwell Dropbox) is a version of Dr. Farwell's Brain Fingerprinting software developed by Dr. Farwell in the early 2000s that Dr. Farwell applied in scientific research, scientific publications, and field applications in criminal investigations and counterterrorism operations around the world. It comprised the addition to 3.0 of a more advanced data analysis section.
    c. Farwell Brain Fingerprinting 5.0, aka Neurodyne (Dr. Maison TFS) is a newer version of the Farwell Brain Fingerprinting software ported from versions 3.0 and 4.0 to the Visual Studio / Microsoft .NET environment and translated to the C# language. Dr. Maison developed it and gave it to Dr. Farwell. This is the software labeled "Dr. Larry Farwell's Application" in Plaintiff's CEO's Affidavit (EFS 20-2, Exhibits B, C, and D).
    d. Farwell Brain Fingerprinting 6.0 (Dr. Maison TFS) is the software that Dr. Farwell sold, transferred, or demonstrated to clients and allowed scientific colleagues at the University of Canterbury to use in conducting research in collaboration with Dr. Farwell.
    e. Dr. Maison BWS Software, aka "iCognative" (Brainwave Science TFS) is the version of the software developed by Dr. Maison for BWS **before BWS obtained a copy of "Farwell Brain Fingerprinting 5.0" / "Neurodyne" / "Dr. Larry Farwell's Application" from Dr. Maison** on June 29, 2021.

f. BWS Fraudulently Modified Software, also aka "iCognative" (Brainwave Science TFS) is the version of the software that BWS modified to make it appear more similar to "Dr. Larry Farwell's Application" **after BWS obtained a copy of "Dr. Larry Farwell's Application" / "Farwell Brain Fingerprinting 5.0" / "Neurodyne" from Dr. Maison** on June 29, 2021.

4. **The most obvious and easily detectable modification that BWS made to the Dr. Maison BWS Software in creating the BWS Fraudulently Modified Software was changing the background color from blue to green.** The various versions of the software and revision histories, which are now in evidence before this Court (BWS TFS, Dr. Maison TFS), will reveal what other changes BWS made in order to make the BWS Fraudulently Modified Software more similar to Dr. Larry Farwell's Application than Dr. Maison BWS Software is to Dr. Larry Farwell's Application.

5. The essential material statements bearing on the major facts at issue in this case in BWS' Statement of Undisputed Material Facts (EFS #106-1) are false. They are not facts, and they are certainly not undisputed.

6. Even if essential material statements bearing on the major facts at issue in this case in BWS' Statement of Undisputed Facts were true – which they are not – and they were undisputed – which they are not – these would be insufficient facts to warrant a summary judgment. To make a summary judgment in favor of Plaintiffs, this Court would have to accept as fact two other major things that are not facts, but rather false fabrications and fraud by BWS. The first of these is as follows.

   a. The foundation of Plaintiff's case in this lawsuit is a comparison between two sets of software code with respect to user interfaces and comparison in Codequiry.

   b. One set of code is "Farwell Brain Fingerprinting 5.0" / "Dr. Maison BWS Software," "Neurodyne," the code developed by Dr. Maison and conveyed to Dr. Farwell, (Dr. Maison TFS), referred to in Plaintiff's documents as "Dr. Larry Farwell's Application" (EFS #20, #20-2, and Exhibits B, C, and D). An examination of Dr. Maison TFS will show, presumably, that this is in fact what Plaintiff Brainwave Science (BWS) represented it to be.

   c. The other set of code Plaintiff represented as Dr. Maison BWS Software, aka "iCognative" (Brainwave Science TFS), the version of the software developed by Dr. Maison for BWS **before BWS obtained a copy of "Farwell Brain Fingerprinting 5.0" / "Neurodyne" / "Dr. Larry Farwell's Application" from Dr. Maison** on June 29, 2021.

   d. In fact, an examination of the relevant evidence now before this Court in BWS TFS will show that the second set of software that BWS submitted for the comparison was NOT the software described in ¶ 3c above that BWS represented it to be. Rather, it was "BWS Fraudulently Modified Software," (BWS TFS) which BWS also called "iCognative" (BWS TFS). This is the version of the software that BWS modified to make it appear more similar to "Dr. Larry Farwell's Application" **after BWS obtained a copy of "Dr. Larry Farwell's Application" / "Farwell Brain Fingerprinting 5.0" / "Neurodyne" from Dr. Maison** on June 29, 2021. (BWS TFS).

e. **The most obvious and easily detectable modification that BWS made to the Dr. Maison BWS Software in creating the BWS Fraudulently Modified Software was changing the background color of the user interface from blue to green.** The revision histories and different versions of the two software programs, which are now in evidence before this Court (BWS TFS, Dr. Maison TFS), will reveal what other changes BWS made in order to make the BWS Fraudulently Modified Software more similar to Dr. Larry Farwell's Application than Dr. Maison BWS Software is to Dr. Larry Farwell's Application.

7. Because of the facts stated in above, the entire foundation of Plaintiff's claims in this lawsuit is based on fraud. Even if all of the statements that Plaintiff claims are "Undisputed Facts" (EFS #106-1) were true and undisputed – which they are not – that would not constitute grounds for a partial summary judgment, because the more fundamental "facts" on which such a judgment would be based are fraudulent fabrications by BWS, not facts.

8. In Judge Cogan's Order of 8/21/2022 the Court stated: "If Dr. Farwell's allegations about BWS fraudulently modifying its software prior to its submission to Codequiry are true, a fact that will only be known once discovery is concluded, then sanctions will be levied against BWS and the preliminary injunction will be lifted." Said allegations are true. Evidence now before this Court (Dr. Maison TFS, BWS TFS) will prove that said allegations are true. Therefore, whereas at the time of the preliminary injunction it was appropriate to provisionally take Plaintiff's demonstrably false statements regarding the software in question as fact, at this stage of the case the Court must consider the actual facts before the Court, which are in evidence now before this Court in Dr. Maison TFS and BWS TFS. In light of the actual facts now in evidence before this Court (Dr. Maison TFS, BWS TFS), a partial summary judgment in favor of Plaintiffs cannot be granted, since the evidence now before this court proves that Plaintiff's entire case is based on fraud.

9. A second reason that, even if the statements that Plaintiff claims are "Undisputed Facts" (EFS #106-1) were true and undisputed – which they are not – this still would not constitute grounds for a partial summary judgment is as follows. In order for there to be grounds for a summary judgment, the software that Dr. Maison conveyed to Dr. Farwell – referred to variously as "Farwell Brain Fingerprinting 5.0," "Dr. Maison BWS Software," "Neurodyne," and "Dr. Larry Farwell's Application" – must contain BWS' proprietary information, which it does not. This document (Dr. Farwell's Affidavit of 2022/12/27) provides ample evidence that said Farwell Brain Fingerprinting software does not contain BWS' proprietary information, evidence that is now before this Court (Dr. Maison TFS, BWS TFS) and is scheduled to be analyzed and evaluated shortly. At a minimum, this issue is not an "undisputed fact." It is disputed. Without this false contention of BWS being accepted as fact, there are no grounds for a partial summary judgment.

10. The available evidence comprises two types of software. Farwell Brain Fingerprinting 3.0 and 4.0 comprise source code that can be printed in a document and executable code that can be stored on a computer hard drive, uploaded to a repository like Dropbox, and downloaded in its entirety. Farwell Brain Fingerprinting 5.0, Dr. Maison BWS Software, and BWS Fraudulently Modified Software are integrated into the Visual Studio Environment and Microsoft .NET. A complete account of the software cannot be simply downloaded as a text or executable file, incorporated in a document, and distributed. The full account of the software, including all the versions and the revision history, must be accessed in the environment in which it exists. For Farwell Brain Fingerprinting 5.0 / Dr. Larry Farwell's Application this is Dr. Maison's TFS

repository. For the Dr. Maison BWS Software and the BWS Fraudulently Modified Software this is BWS' TFS repository. The only way to access this software for testing, evidence, or any other purpose is for Dr. Maison and Brainwave Science to provide access to their respective TFS repositories to Mindfire. This is a simple process that takes less than five minutes.

11. In its original Complaint (EFS #1) and MOL in Support of Motion for Summary Judgment (EFS #20) and Ika's Affidavit (EFS #20-2 and Exhibits B and D thereto), Plaintiff Brainwave Science defrauded this Court in the following way.

    a. Plaintiff had Dr. Maison BWS Software in their TFS repository, as Dr. Maison had developed it for BWS (EFS #20).

    b. BWS obtained from Dr. Maison a copy of "Brain Fingerprinting 5.0" / "Neurodyne" / "Dr. Larry Farwell's Application" from Dr. Maison (EFS #20).

    c. Then BWS fraudulently modified "Dr. Maison BWS Software" / "iCognative" to make it more similar to "Dr. Larry Farwell's Application" (BWS TFS, Dr. Maison TFS, EFS #24, Dr. Farwell 12/27/2022 Affidavit).

    d. One way in which the software was modified was to change the background color of the user interface. All versions of "Maison BWS Software" / "iCognative" before June 29, 2021 when BWS obtained "Dr. Larry Farwell's Application" from Dr. Maison (EFS #89 p. 1:26 - 28), had a blue background (EFS #89 1:20 – 2:9). "Dr. Larry Farwell's Application" had a green background. BWS Modified "iCognative" to change the background from blue to green to match "Dr. Larry Farwell's Application" (Dr. Farwell 12/27/2022 Affidavit; EFS #89 1:20 – 2:9).

    e. Then Ika developed Ika Affidavit (EFS 20-2) and Exhibit D thereto to show the two user interfaces side by side. BWS falsely represented that the software compared to "Dr. Larry Farwell's Application" (Dr. Maison TFS) was the original, unmodified "iCognative" (BWS TFS) developed by Dr. Maison for BWS. In fact, **the software actually compared was the Fraudulently Modified BWS Software (which BWS also called "iCognative"), which had been specifically modified to more closely resemble "Dr. Larry Farwell's Application".** This can be readily proven with evidence now before this Court, by Mindfire comparing the various versions, dates, and modification histories of "Dr. Larry Farwell's Application" in Dr. Maison's TFS with the various versions, dates, and modification histories of "iCognative" in BWS' TFS. Mindfire already has, or will shortly have, access to Dr. Maison's TFS and BWS' TFS in order to accomplish the court-ordered comparison. This is a necessary step for Mindfire to accomplish the comparison task described in the Scope of Work, because to compare different software programs Mindfire must know and be able to prove definitively which software programs were compared.

    f. Examining the modification histories and identifying the several versions of each software program in Dr. Maison TFS and BWS TFS is a necessary prerequisite for Mindfire conducting its comparison tests. Otherwise, Mindfire will not know what is being compared to what. It is necessary for Mindfire to differentiate between "Dr. Maison BWS Software" and "BWS Fraudulently Modified Software" in order to know what is actually being compared to Dr. Farwell's software. (Dr. Maison TFS, BWS TFS). Otherwise, any comparison would be meaningless or worse. If a comparison based on false representations by BWS regarding what software is being compared – as the original comparison that formed the foundation of Plaintiff's Complaint was –

then the comparison would be fraudulent, like the original comparison that formed the foundation of Plaintiff's case.

g. BWS also submitted "Dr. Larry Farwell's Application" (Dr. Maison TFS) and the "Fraudulently Modified BWS Software" (BWS TFS) to Codequiry to test the similarity between the two. Again, BWS falsely represented that the software compared to "Dr. Larry Farwell's Application" was the original, unmodified software (Dr. Maison BWS Software) developed by Dr. Maison for BWS. In fact, **the software actually compared was the Fraudulently Modified BWS Software (which BWS called "iCognative"), which had been specifically modified to more closely resemble "Dr. Larry Farwell's Application".**

h. BWS also submitted only part of the "iCognative" (BWS TFS) and "Dr. Larry Farwell's Application" (Dr. Maison TFS) code to Codequiry (Ika Affidavit EFS #20-2, Exhibit D, pages 7, 8.). BWS did not submit for comparison the parts of the software that were totally different between the two, namely the parts that communicated with the two different headsets used by BWS and Dr. Farwell (BWS TFS, Dr. Maison TFS).

i. In the Ika Affidavit (EFS 20-2, Exhibit D, p. 8) the navigation page has been changed from blue to green in the BWS software on the left of the page. The Replay function that overlays the navigation page still has a blue background, like all screens in all versions of BWS Software before BWS obtained the code with the green background from Dr. Maison and modified their code to match. This may be because the Replay function involves real-time activities (such as displaying ongoing EEG), and no one at BWS after Dr. Maison's exit has the necessary software development skill to modify this complicated code. The trivial navigation and data entry pages are easy to modify; the actual functional pages are more difficult. In any case, this screenshot illustrates that BWS modified the Dr. Maison BWS Software to change the blue background to a green background to make it appear more similar to Dr. Larry Farwell's Application. (The Replay function was copied from the "Demo" function in Farwell Brain Fingerprinting 3.0, and has an identical user interface to the same.) (Dr. Maison TFS, BWS TFS).

12. **The fraud by BWS in generating BWS' Fraudulently Modified Software can readily be exposed in the course of Mindfire's court-ordered comparisons of the software by examining the dates and version history in BWS TFS and Dr. Maison TFS, which is an integral and necessary part of the court-ordered comparison**. This is a prerequisite for Mindfire to make any software comparisons. Mindfire cannot make meaningful comparisons until they have determined which software is being compared. (Dr. Farwell 12/27/2022 Affidavit, Dr. Maison TFS, BWS TFS).

13. **BWS can defraud this court a second time only if the Court cooperates in this fraud by allowing BWS to refuse to provide Mindfire access to BWS TFS and instead proffers the Fraudulently Modified BWS Software and falsely represents that it is the original, unmodified Dr. Maison BWS Software that Dr. Maison provided to Dr. Farwell.** This would simply be a repeat of the fraud perpetrated by BWS that forms the foundation of this lawsuit. Note that it is easy to fabricate or fake source code and executable files stored on computer disk or transferred electronically. **Both the content and the dates of such files can be fraudulently altered. However, the versions, version history, and modification history in Brainwave TFS and Dr. Maison TFS cannot be faked or fraudulently modified. The version history is**

embedded in the TFS data, and cannot be modified. For this reason, it is necessary for Mindfire to directly access BWS TFS and Dr. Maison TFS, and not simply assume that BWS' representations regarding the software they may proffer outside TFS are truthful.

14. **Ika and Tomkins lied about the software in the documents that are the foundation of this case (EFS #1, EFS #20, EFS #24) – as can now be readily proven with evidence now before this Court in the BWS TFS and the Dr. Maison TFS. Ika and Tomkins could certainly defraud this Court again if this Court takes their lies as fact rather than considering the actual evidence that is now before this Court in Dr. Maison TFS and BWS TFS.**

    a. In the Codequiry test and screenshots that are the foundation of Plaintiff's Complaint, Plaintiff lied to this Court and falsely represented that the code submitted to Codequiry was Dr. Maison's BWS Code, the software that Dr. Maison developed for BWS. In fact, the code submitted to Codequiry and represented in the screenshots (EFS #20, Exhibit D) was BWS Fraudulently Modified Software, which had been changed from a blue background to a green background to more closely match Dr. Larry Farwell's Application to which it was compared.

    b. The only way to prevent BWS from defrauding this Court again is to use the actual software in BWS TFS for the comparisons, since the TFS environment contains a record of the software, dates, and versions that, unlike files stored on BWS' disks, cannot be faked.

15. The specific method for proving that the foundation of this lawsuit presented by BWS is fraudulent is to show that BWS did not have any version of iCognative with a green background before June 29, 2021, as follows.

    a. June 29,2021 is the date BWS received "Dr. Larry Farwell's Application" from Dr. Maison – and subsequently modified their "iCognative" code to have a green background to match Dr. Larry Farwell's Application (EFS #89, page 2, 1 – 9).

16. To be valid, the proof must include Visual Studio access to the files that create the visual interface (XAML files) with a review of the TFS change history of those files. Brainwave Science is using an on-premises TFS server. To be valid, the proof must also include a validation of the application installer program analyzed for digital signature, modified and creation date, and installed to verify the background color. The digital certificate used for code-signing is provided by DigiCert (a Microsoft-approved code-signing certificate vendor) and is timestamped with web time service. This means, in practice, that the time of different modifications and versions cannot be faked if the proper procedure outlined here to find the facts is followed by the finder of fact. (EFS # 89, 1:20 – 2:20).

    a. Any failure of BWS providing a functioning application with a green background properly traceable to Brainwave Science development environment (TFS), properly dated before June 29, 2021, with a digital signature, will provide proof that Ika's Affidavit (EFS #20-2, Exhibit D), and the entire foundation of this lawsuit were fabricated and fraudulent.

    b. Any excuses from BWS as to why they will not allow this Court, through Mindfire, to access the definitive evidence now before this Court, as described above – and any demands that this Court should simply accept BWS' representations as fact, regarding the substantive matters at hand, rather than accessing the actual evidence and

determining the actual facts – will be easily recognized as a transparent attempt by Ika and Tomkins to obstruct this Court's mission as a finder of fact.

17. There is a second reason, in addition to the above-described fraud by BWS, why Dr. Larry Farwell's Application is similar to and has similar user interfaces to various versions of BWS Software. The reason is this: Both the software designed by Maison for BWS and the software designed by Maison for Dr. Farwell were accomplished by porting Dr. Farwell's pre-existing Farwell Brain Fingerprinting 3.0 and 4.0 to a different development environment and programming language.

    a. BWS stated "BWS' technology team members located an online demonstration video wherein Farwell is depicted demonstrating a system with a nearly identical user interface to that designed by Maison for BWS" (EFS 20, P. 3, 1 – 9). The reason for this is described below.

    b. All versions of software that implement Dr. Farwell's Brain Fingerprinting invention, including Dr. Larry Farwell's Application (the version that BWS compared with BWS Software) and the Maison BWS Software, had the same two functions: 1. Measuring brainwaves; and 2. Analyzing brainwaves (Dr. Maison TFS, Dr. Farwell's 12/27/2022 Affidavit).

    c. All versions of the software have two user interfaces that correspond to the two functions of the program: the Brainwave Measurement User Interface and the Brainwave Analysis User Interface (Dr. Maison TFS, Dr. Farwell Dropbox, Dr. Farwell's 12/27/2022 Affidavit).

    d. The Brainwave Measurement User Interface and the Brainwave Analysis User Interface for all versions of such software at issue in this case display all of the brainwave data and other data that are measured, analyzed, computed, concluded, determined, and recorded. These data include subjects' brainwaves, subjects' reaction times and accuracy, conclusions regarding whether the tested information is stored in the subject's brain, etc. In short, everything of substance in the entire program is displayed on these two user interfaces (Dr. Maison TFS, Dr. Farwell's 12/27/2022 Affidavit).

    e. **All of the data that are measured, analyzed, computed, concluded, determined, and recorded, in all versions of the BWS Software, are identical to the same in Dr. Farwell's Farwell Brain Fingerprinting 3.0 and Farwell Brain Fingerprinting 4.0, both of which existed before Brainwave Science was founded in 2012.** The software Dr. Maison produced for Brainwave Science was simply a copy and translation to a new language and platform of Farwell Brain Fingerprinting 3.0 (for data analysis) and Farwell Brain Fingerprinting 4.0 (for brainwave measurement) (Dr. Maison TFS, Dr. Farwell Dropbox, Dr. Farwell's 12/27/2022 Affidavit).

    f. **The Brainwave Measurement User Interface for all versions of the BWS Software is identical to the Brainwave Measurement User Interface of Farwell Brain Fingerprinting 4.0, which existed before BWS was founded** (BWS TFS, Dr. Maison TFS, Dr. Farwell Dropbox).

    g. **The Brainwave Analysis User Interface for all versions of the BWS Software is identical to the Brainwave Analysis User Interface of Farwell Brain Fingerprinting 3.0, which existed before BWS was founded.**

18. The Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface (Maison TFS, Dr. Farwell Dropbox, and screenshots below) and the Brainwave Measurement User Interface in the Dr. Maison BWS Software – the "Dr. Larry Farwell's Application" that BWS used in its comparisons (EFS #20, EFS 20-2, Exhibit D) – contain 7 identical plots of brainwaves and 38 identical entries in tables. All of these are in the same layout on the page. There are only very minor differences: Farwell Brain Fingerprinting 4.0 contains three additional rows of algorithms for eliminating noise that are not included in BWS. Each of the two contains 2 – 3 additional buttons for navigation or adjustment. Background colors and relative sizes of features vary.

19. The Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface and the BWS Brainwave Analysis User Interface Data Display Section both include the following exact same items, in the same layout on the page:

    a. A brainwave plot with the three types of brain responses displayed in the same respective colors and format;

    b. Two summary results, a Determination and a Statistical Confidence, displayed in the same format.

    c. Tables with a total of 30 cells, all containing the same information in Farwell Brain Fingerprinting 3.0 and Dr. Maison BWS Software, with minor differences in the layout (rows and columns reversed).

20. ***Long before BWS existed there were numerous "online demonstrations in which Farwell is depicted demonstrating a system with a nearly identical user interface to that designed by Maison for BWS."*** These online demonstrations were of Farwell Brain Fingerprinting 3.0 and 4.0 (Dr. Farwell Dropbox). This includes both of the two user interfaces that display the two functions of all versions of such software and all of the data that are measured, analyzed, computed, concluded, determined, and recorded by all of the software programs at issue in this case. Both Brainwave Measurement and Brainwave Analysis User Interfaces were virtually identical between multiple online demonstrations by Dr. Farwell that took place before BWS existed and the user interface of the software that Dr. Maison developed for BWS (and also the Farwell Brain Fingerprinting 5.0 software that Dr. Maison developed for Dr. Farwell and the BWS Fraudulently Modified Software). This document (Dr. Farwell's Affidavit of 2022/12/27) at ¶ 117 lists 12 examples of such online demonstrations, with links to online sources.

21. If "identical user interfaces" means that there has been plagiarism, then all versions of BWS Software are plagiarized from Farwell Brain Fingerprinting 3.0 and 4.0, which existed before BWS did. If the software that Dr. Maison provided to Dr. Farwell ("Farwell Brain Fingerprinting 5.0" / "Dr. Larry Farwell's Application") was plagiarized from anywhere, then it was plagiarized from Farwell Brain Fingerprinting 3.0 and 4.0, and not from BWS (Dr. Maison TFS, BWS TFS, Dr. Farwell Dropbox).

22. There is controversy over the timing of the development of Farwell Brain Fingerprinting 5.0 and the Dr. Maison BWS Software – which came first, if they overlapped, if one contributed to the other, etc. Regardless of these considerations, both Farwell Brain Fingerprinting 5.0 and Dr. Maison BWS Software comprise simply porting Farwell Brain Fingerprinting 3.0 and 4.0, according to the Brain Fingerprinting Specifications (Exhibits CAA, CAB, and CAC) provided by Dr. Farwell to Dr. Maison to a different platform and a different language. Everything in both Brain Fingerprinting 5.0 and Dr. Maison BWS Software is open source and in the public domain, except for the respective sections that communicate with the

respective different headsets. Everything that the two programs have in common is in the public domain, so the discussions about the relationship between the two programs do not change the fact that Dr. Maison's entire contribution to Dr. Larry Farwell's Application is in the public domain and does not comprise anything developed at BWS (except the headset communication developed by Dr. Maison for Dr. Farwell, which is not open source but has no relationship to BWS' software). (Dr. Maison TFS, BWS TFS, Farwell Dropbox).

23. Plaintiff claims that "Brainwave took reasonable steps to keep its trade secret information which derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by other persons." (EFS #106-6, p. 11) That statement is not supported by the evidence. The BWS Software was released to a public domain source at 6:15 PM on 9/10/2017 from IP address 65.52.55.39 in Chicago, using the credentials of BWS employee Karuna Raja, who was in Southborough, MA at the time. (EFS #80, p. 4). This is documented in Exhibit CAD to this document. In his Affidavit (EFS 20), Ika admitted that the BWS Software was uploaded to the internet, but falsely stated that it was uploaded to a secure cloud server. Dr. Maison later downloaded the software from a public source on the Internet (EFS #106-3, Exhibit A, p. 11 – 12).

24. Dr. Lawrence Farwell invented Farwell Brain Fingerprinting in 1985 and developed the first Farwell Brain Fingerprinting system, Farwell Brain Fingerprinting 1.0. Software was written in Fortran and assembly code. Hardware comprised two computers, a DEC PDP11-73 with custom digital signal-processing and display boards for brainwave measurement and a Harris 800 for brainwave analysis, plus Grass EEG amplifiers to amplify the brainwaves. (Farwell and Donchin 1991[1]). There was no headset; electrodes were glued to the head of the subject, as was the standard procedure at the time, before Dr. Farwell developed and patented his first headset. Electrodes communicated through wires to Grass EEG amplifiers, which in turn communicated through wires to the digital signal-processing board in the computer.

25. Farwell Brain Fingerprinting 1.0 and all subsequent software discussed herein had two functions: (1) measuring and recording brainwaves; and (2) analyzing brainwaves.

26. Farwell Brain Fingerprinting 1.0 and all subsequent versions measure the P300 brain response in the EEG. The P300 is an event-related brain potential (ERP); that is, a pattern of EEG that is elicited by a particular event, generally the presentation of a stimulus (such as a word or phrase presented on a computer screen) and the subject's cognitive processing of the same. The P300 was discovered in the 1960s and has been published in thousands of scientific studies. Dr. Farwell's first scientific paper on the P300 alone (Farwell and Donchin 1988[2]) has been cited by over 4,000 other papers in the scientific literature (https://scholar.google.com/citations?user=wgZhgc0AAAAJ&hl=en). Dr. Farwell's first paper on Farwell Brain Fingerprinting (Farwell and Donchin 1991) has been cited by over 800 other papers in the scientific literature (https://scholar.google.com/citations?user=wgZhgc0AAAAJ&hl=en).

---

[1] Farwell, L. A. and Donchin, E. (1991). The Truth Will Out: Interrogative Polygraphy ("Lie Detection") With Event-Related Brain Potentials. *Psychophysiology, 28:531-547; Psychophysiology website*

[2] Farwell, L. A. and Donchin, E. (1988). Talking off the top of your head: Toward a mental prosthesis utilizing event-related brain potentials. *Electroencephalography and Clinical Neurophysiology, 70*: 510-513.

27. Farwell Brain Fingerprinting also measures the P300-MERMER (memory and encoding related multifaceted electroencephalographic response), a more comprehensive brainwave pattern that includes the P300 and additional related brainwave patterns. It was discovered, published, and patented by Dr. Farwell (Farwell and Smith 2001; Farwell 2012; Farwell et al. 2013; 2014; 2022; US Patents #5,363,858, #5,406,956, #5,467,777, and # 7,689,272).

28. Dr. Farwell developed Farwell Brain Fingerprinting 2.0 in the late 1980s and early 1990s. Hardware and software were similar to Farwell Brain Fingerprinting 1.0, except for the addition of a new patented headset that contained embedded sensors to measure brainwaves. Amplification was still accomplished separately from the headset by the EEG amplifiers.

29. Dr. Farwell, Brian Foote, and Himansu Desai developed Farwell Brain Fingerprinting 3.0 in 1993. This comprised the same methods, algorithms, and data for brainwave measurement and analysis as the previous versions. The code was written in C++. The hardware comprised a PC tower computer with a special digital signal-processing board and a special display board. The headset was the same as previous versions. At various times the system used several different custom and manufactured EEG amplifiers.

30. All of the above versions of Farwell Brain Fingerprinting were developed according to the Farwell Brain Fingerprinting Specifications, comprising two sections: Brainwave Measurement Specifications and Brainwave Analysis Specifications (Farwell Dropbox).

31. Dr. Farwell patented the Farwell Brain Fingerprinting System, including the Farwell Brain Fingerprinting Specifications (US Patents #5,363,858, #5,406,956, #5,467,777, and # 7,689,272).

32. Dr. Farwell published the Farwell Brain Fingerprinting System, including the Farwell Brain Fingerprinting Specifications, in the peer-reviewed scientific literature (Farwell and Donchin 1991; Farwell and Smith 2001[3]; Farwell 2012[4]; Farwell et al. 2013[5]; Farwell et al. 2014[6]; Farwell and Richardson 2022[7]).

---

[3] Farwell, L. A. and Smith, S. S. (2001). Using Brain MERMER Testing to Detect Concealed Knowledge Despite Efforts to Conceal. *Journal of Forensic Sciences 46*,1: 135-143. https://larryfarwell.com/pdf/Farwell-Smith-Journal-of-Forensic-Sciences-Brain-Fingerprinting-P300-MERMER-dr-larry-farwell-dr-lawrence-farwell.pdf

[4] Farwell, L.A., 2012. Brain fingerprinting: a comprehensive tutorial review of detection of concealed information with event-related brain potentials, *Cognitive Neurodynamics 6*:115-154, DOI 10.1007/s11571-012-9192-2. Available at https://larryfarwell.com/pdf/Dr-Lawrence-Farwell-Brain-Fingerprinting-P300-MERMER-Review-Cognitive-Neurodynamics-Dr-Larry-Farwell.pdf or from the National Institutes of Health: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311838/

[5] Farwell, L.A., Richardson, D.C., & Richardson, G.M. (2013). Brain fingerprinting field studies comparing P300-MERMER and P300 brainwave responses in the detection of concealed information. DOI 10.1007/s11571-012-9230-0, *Cogn Neurodyn*. *7*(4): 263-299. Available at: http://link.springer.com/article/10.1007/s11571-012-9230-0 .

[6] Farwell L.A., Richardson D.C., Richardson G.M .and Furedy J.J. (2014). Brain fingerprinting classification concealed information test detects US Navy military medical information with P300. *Front. Neurosci. 8*:410. doi: 10.3389/fnins.2014.00410. Available at: http://journal.frontiersin.org/article/10.3389/fnins.2014.00410/abstract

[7] Farwell, L.A. & Richardson, D.C. (2022). Brain fingerprinting field study on major, terrorist crimes supports the brain fingerprinting scientific standards hypothesis: classification concealed information test with P300 and P300-MERMER succeeds; comparison CIT fails. *Cogn Neurodyn*. 1 March 2022. DOI 10.1007/s11571-022-09795-1. Available at: https://farwellbrainfingerprinting.com/pdf/Ex/Farwell_Richardson_2022_Brain_Fingerprinting_on_Major_Ter

33. Other scientists have developed similar systems using the Farwell Brain Fingerprinting patents and scientific publications, and in some cases source code provided by Dr. Farwell to fellow scientists who replicated his research.

34. Dr. Farwell and others developed Farwell Brain Fingerprinting 4.0 in or about 2007. This included the same brainwave measurement hardware and software as version 3.0, with a new version of the data analysis module written in IDL code (Dr. Farwell Dropbox, Farwell 2012; Farwell et al. 2013; Farwell et al. 2014; Farwell and Richardson 2022).

35. All of the versions Farwell Brain Fingerprinting and all similar systems for brainwave-based detection of concealed information have two and only two functions: (1) measuring brainwaves; and (2) analyzing brainwaves.

36. In order to measure brainwaves, the software must have a section that communicates with the headset (or digital signal-processing board, for systems in which this is separate from the headset). This portion of the software code execution takes place in the background and is invisible to the user. This portion of the code is different for each headset, and is often custom code that may be proprietary.

37. As a preparation for performing its two functions, the program must have identifying information about the subject (subject number, name, etc.) and information regarding what words or pictures ("stimuli") will be displayed to elicit the brainwave responses. These are input through a standard keyboard and data entry screens. The appearance of the data entry screens will vary depending on which open-source software packages are used for this purpose. Data entry is essentially the same for all programs for detection of concealed information, and for that matter for almost all programs that involve any kind of measurements of EEG or any other measurements related to cognitive processing. When it is implemented using open-source software development tools, as all versions of the software at issue in this case have been, there is nothing that might be construed as proprietary in this data-entry process or the software it involves.

38. Similarly, virtually all software programs have navigation pages, tabs, navigation buttons, etc. that allow the user to access and activate the actual functions of the program – in this case, the two functions of measuring brainwaves and analyzing brainwaves. All versions of Farwell Brain Fingerprinting and all versions of Brainwave Science software have such navigation pages, tabs, navigation buttons, etc. All of these are similar in function. They differ in appearance in the different programs depending on the open-source software used to implement them. All of this is in the public domain, and none of these ancillary navigation pages could be considered proprietary.

39. The Farwell Brain Fingerprinting Specifications and all the methods, algorithms, functions, and software of Farwell Brain Fingerprinting 4.0 for (1) brainwave measurement; and (2) brainwave analysis are all in the public domain, having been published in Dr. Farwell's patents and scientific publications as well as shared with other scientists.

40. All software for brainwave-based detection of concealed information, and in fact all software for brainwave measurement involving responses to stimuli, include several standard methods

---

rorist_Crimes_Cognitive_Neurodynamics.pdf and https://link.springer.com/article/10.1007/s11571-022-09795-1.

for detecting and removing "noise" from the system. These are included in all versions of Farwell Brain Fingerprinting, in the Farwell Brain Fingerprinting Specifications, and in Dr. Farwell's patents and scientific publications. These include the following:

a. Signal averaging. This involves presenting the same or similar stimuli repeatedly and averaging the responses. This is a fundamental aspect of the method for all such programs.

b. A "Range" function for rejection of noise generated by eye blinks and other eye movements. The eyes are electrically charged. When a person blinks, the eyes move and generate electrical voltage signals that interfere with the brainwaves being measured. These are eliminated by a simple procedure. One or more sensors are applied to measure the electrical signals coming from eye movements. If this surpasses a certain maximum range, then the corresponding data are rejected. The software for implementing this is open source and involves a few lines of code.

41. Almost all event-related brain potential EEG research applies digital filters to eliminate high-frequency noise in the signal. (This is produced primarily by muscle movements, which generate electrical impulses that interfere with the brainwaves being measured.) The standard digital filters used in P300 research and all event-related brain potential research are optimal digital filters that were introduced to the field by Dr. Farwell and his colleagues (Farwell et al. 1993[8]). These are included in all versions of Farwell Brain Fingerprinting.

42. Dr. Farwell and his colleagues developed a specific open-source software program (FILTER.FOR) that implements said optimal digital filters. This program is translated into the appropriate software languages and included in all Farwell Brain Fingerprinting versions. Dr. Farwell and his colleagues also updated and modified a pre-existing open-source program (PMFILT.FOR) that generates the digital filters according to parameters specified by the user. This program or its equivalent has been translated into many other software languages and ported to many other software platforms that are in common use.

43. Said optimal digital filters as a method for eliminating noise in the EEG signal were included in the Farwell Brain Fingerprinting specifications, patents, and scientific publications.

44. In addition to the "Range" criterion for eliminating eye movements and the standard optimal digital filters, Farwell Brain Fingerprinting 3.0 included the following four additional methods for eliminating noise in the EEG signal during brainwave measurement. "Clip" indicated that the EEG signal had saturated the digitizer at a particular channel. "Threshold" indicated that the EEG signal had exceeded an amplitude threshold at a particular channel. "Slope" indicated that the slope of the waveform exceeded a criterion. MAD or mean absolute deviation indicated that the overall amplitude of the EEG waveform exceeded a criterion.

45. In addition to the "Range" criterion for eliminating eye movements and the standard optimal digital filters, Farwell Brain Fingerprinting 4.0 included the following additional methods for eliminating noise in the EEG signal during brainwave analysis. "Threshold" as defined above; "Slope" as defined above; "Variance" indicating excessive variation in the EEG signal; "Instantaneous slope" indicating changes in the EEG voltage that are both large and fast; "Flatline" indicating that a segment of the signal is a flat line; i.e., no brainwaves are present

[8] Farwell, L. A., Martinerie, J. M., Bashore, T. R., Rapp, P. E., and Goddard, P.H. (1993). Optimal digital filters for long latency event-related brain potentials. *Psychophysiology, 30,* 3, 306-315

during a time segment where brainwaves are being measured, which results in rejection of the corresponding brain-response data.

46. In or about 2018, Dr. Farwell desired to develop Farwell Brain Fingerprinting 5.0. There are several purposes for this. Dr. Farwell had obtained a headset built by Cognionics / CGX to Dr. Farwell's specifications. This had several advantages over previous versions of the headset. This new headset contained not only sensors to pick up the EEG signal from the head, but also amplifiers and digital signal processors built into the headset. It communicated wirelessly with the computer through Bluetooth. This resulted in a more user-friendly experience for both the subject and the scientist applying the technology. Another purpose was to port Dr. Farwell's open-source software embodied in Farwell Brain Fingerprinting 4.0 to another open-source platform and another language, using several modern open-source software development tools. Farwell Brain Fingerprinting 4.0 was written primarily in C++. Some algorithms were written by Dr. Farwell in Fortran, in particular, the FORTRAN.FOR code that implemented the optimal digital filters for eliminating noise from the signal.

47. Dr. Thierry Maison volunteered to port Farwell Brain Fingerprinting 4.0 to the Microsoft Visual Studio platform using Microsoft .NET and the C # programming language, all implemented with open-source software tools. Dr. Maison neither asked for nor received any compensation for this. His motivation was simply to learn from the undertaking and to help to make Farwell Brain Fingerprinting more available for counterterrorism and criminal investigations around the world.

48. With one exception noted below, all of the Farwell Brain Fingerprinting 5.0 code developed by Dr. Maison was open source, and all of it was simply ported or translated from Dr. Farwell's existing code in Farwell Brain Fingerprinting 3.0 and 4.0 and the detailed specifications provided to Dr. Maison by Dr. Farwell. These were also fully disclosed in Dr. Farwell's Brain Fingerprinting patents and scientific publications.

49. The one segment of the Farwell Brain Fingerprinting 5.0 code that was not open source and was not ported from Farwell Brain Fingerprinting 4.0 was the code that interfaced with the new Cognionics headset. Since the digital signal processors and communication protocols in this headset were different from the ones previously used by Dr. Farwell – and from other wireless headsets from other companies – Dr. Maison wrote custom code for interfacing with the Cognionics headset that became a part of Farwell Brain Fingerprinting 5.0.

50. Dr. Maison's task in porting Farwell Brain Fingerprinting 4.0 to Farwell Brain Fingerprinting 5.0 involved integration or stitching together of open-source software from various sources. This integration task is accomplished according to a blueprint or software development specifications. The integration task performed by Dr. Maison in porting Farwell Brain Fingerprinting 4.0 to Farwell Brain Fingerprinting 5.0 was specified in detail in the open-source Brain Fingerprinting Brainwave Measurement Specifications (Exhibit CAA) and the open-source Brain Fingerprinting Brainwave Analysis Specifications (Exhibit CAB) and open-source Randomization Algorithm (Exhibit CAC) provided by Dr. Farwell to Dr. Maison, as well as in the structure and integration of Farwell Brain Fingerprinting 4.0 and 3.0, which was also provided to Dr. Maison by Dr. Farwell. The software integration involved in Dr. Maison's development of Farwell Brain Fingerprinting 5.0, aka the Dr. Maison BWS Software, was open source and in the public domain.

51. Like all previous versions, Farwell Brain Fingerprinting 5.0 included algorithms for eliminating noise from the signal. Farwell Brain Fingerprinting 5.0 included some, but not

all, of the algorithms for eliminating noise from the signal that were included in Farwell Brain Fingerprinting 4.0.

52. The following algorithms for eliminating noise were included in Farwell Brain Fingerprinting 5.0.

    a. The standard signal averaging included in all P300 and other event-related brain potential programs.

    b. The standard "Range" method for eliminating noise produced by eye movements that is included in almost all P300 and other event-related brain potential programs.

    c. The optimal digital (low-pass) filters that were included in Farwell Brain Fingerprinting 4.0. These are the standard optimal digital filters that Dr. Farwell and his colleagues introduced to the field in a scientific publication (Farwell et al 1993[9]). These filters are public domain and also commonly used in many other digital signal-processing applications across a wide range of fields. Specifically, Dr. Maison translated Dr. Farwell's FORTRAN.FOR program line for line from Fortran to C # to implement the optimal digital filters in Farwell Brain Fingerprinting 5.0.

53. The other algorithms in Farwell Brain Fingerprinting 4.0 that are described above were not included in Farwell Brain Fingerprinting 5.0.

54. One additional algorithm for eliminating noise was included in Farwell Brain Fingerprinting 5.0 that was not included in Farwell Brain Fingerprinting 4.0. This is a standard, open-source high-pass digital filter used to counteract electrode voltage drift. (This was not necessary for Farwell Brain Fingerprinting 4.0 software, because it was handled by the digital signal processor hardware.)

55. Farwell Brain Fingerprinting 5.0, like all previous versions, had two functions (1) measuring brainwaves while presenting stimuli (words or pictures on a computer screen) to elicit the EEG brain response; and (2) analyzing brainwaves.

56. For both measuring brainwaves and analyzing brainwaves, Farwell Brain Fingerprinting 5.0 included all the same computations as Farwell Brain Fingerprinting 4.0. The only difference was the programming language and the corresponding development platform. Farwell Brain Fingerprinting 5.0 was simply Farwell Brain Fingerprinting 4.0 ported and translated to a new platform and a new language, using different open-source programming tools.

57. For brainwave measurements, the output of these functions and algorithms was displayed on the Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface. This had the following design.

    a. At the upper left is a plot of the ongoing brainwaves in four channels from four scalp locations. One of these is the eye-movement channel, and three are EEG from three scalp locations, named Fz, Cz, and Pz.

    b. Below that is a plot of the average brain responses to three types of stimuli (words or pictures presented to the subject). Brain responses to "target," "irrelevant," and "probe" are plotted respectively with red, green, and blue lines. These are the standard colors used in all Farwell Brain Fingerprinting versions and all BWS software.

[9] Farwell, L. A., Martinerie, J. M., Bashore, T. R., Rapp, P. E., and Goddard, P.H. (1993). Optimal digital filters for long latency event-related brain potentials. *Psychophysiology, 30,* 3, 306-315

c. At the upper right is a table that lists the following essential output: the type of stimulus, the stimulus, and the reaction time. (This table also has two non-essential items, the number of the channel being displayed in the brainwave plots and the scale of the plots).

d. Below that is a table that has columns for three stimulus types: Target, Probe, and Irrelevant. It has rows for the following:

i. Trials (total number of trials; a trial is comprises one stimulus presentation and the corresponding brain responses);

ii. Good trials (total number of trials that do not have noise in the data);

iii. Required trials (number of trials required to complete the test);

iv. RT or Reaction Time (the subject's average button-press response time);

v. Accuracy (the percentage accuracy of the subject's button presses).

e. Below that is a table that tabulates the result of the algorithms for eliminating noise from the data. The columns are the four channels; i.e., three EEG channels and one eye-movement (EOG) channel. The rows display the numbers for the different algorithms for eliminating noise. These comprise the standard "Range" algorithm plus four additional ones: "Clip," "Threshold," "Slope," and "MAD." (These are described above.)

58. The Farwell Brain Fingerprinting 5.0 Brainwave Measurement User Interface is identical to the Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface in all essential features. Even the standard Farwell Brain Fingerprinting colors for the "Target," "Probe," and "Irrelevant" brainwave plots are identical.

a. The only differences are trivial and not related to the essential functions and data displayed, as follows: minor cosmetic differences like the color of the background and the relative size of the plots; a couple different navigation buttons; an extra non-essential channel plotted in the ongoing brainwaves in 5.0; and the number of rows in the table on noise-elimination algorithms. (The 4.0 table has four rows corresponding to the four noise-elimination algorithms, and the 5.0 table has only one row because only the standard "Range" algorithm was implemented in 5.0.)

b. Note that Dr. Maison changed the user-interface background color to green in 5.0. This is discussed elsewhere in this document in reference to different versions and modifications of the software.

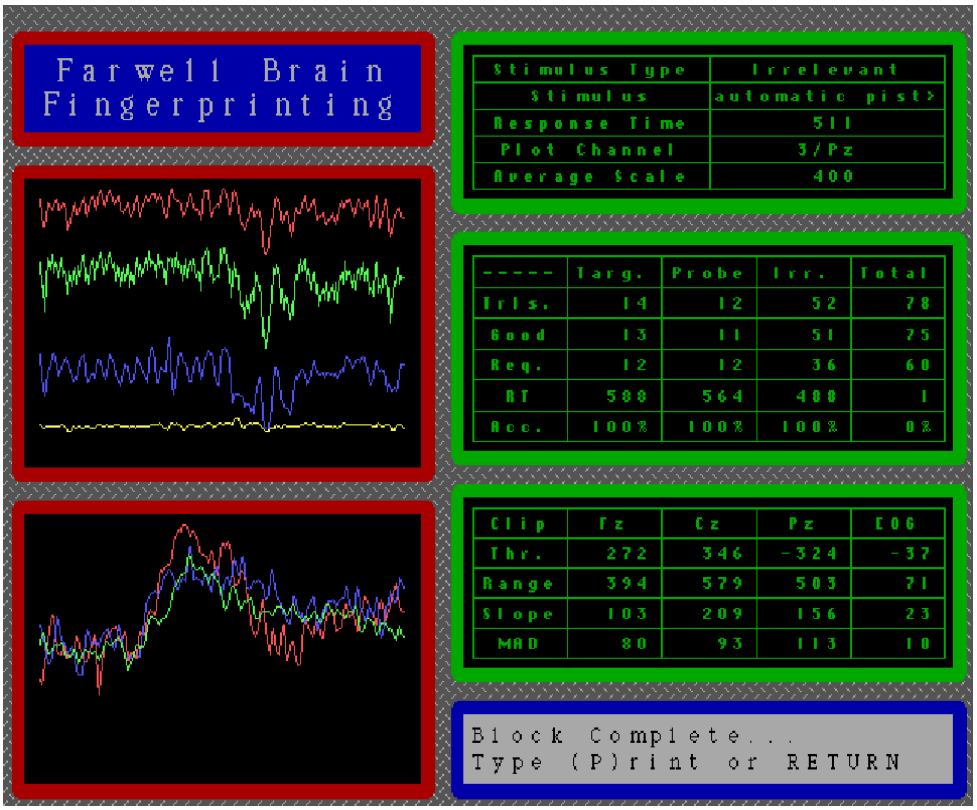
59. The Farwell Brain Fingerprinting 4.0 and 5.0 Brainwave Measurement User Interfaces are virtually identical. Both contain 7 identical plots of brainwaves and 38 identical entries in tables. Farwell Brain Fingerprinting 4.0 contains three additional rows of algorithms for eliminating noise that are not included in 5.0. Each of the two contains 2 – 3 additional buttons for navigation or adjustment.

60. In summary, the respective brainwave-measurement functions and algorithms are identical for Farwell Brain Fingerprinting 4.0 and 5.0. The user interfaces for version 4.0 and 5.0 report all of the same data, and display the data in virtually identical ways. This is because Dr. Maison copied Dr. Farwell's Farwell Brain Fingerprinting 4.0 code and detailed specifications – which were also included in Dr. Farwell's patents and prior scientific publications – in developing Farwell Brain Fingerprinting 5.0. Farwell Brain Fingerprinting 5.0 comprised

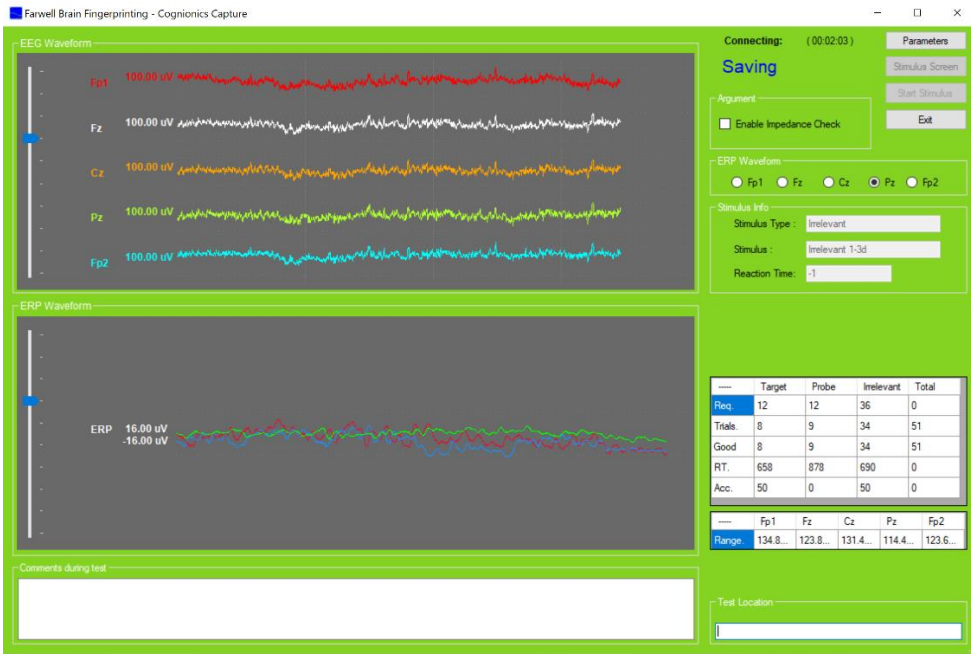
simply porting Farwell Brain Fingerprinting 4.0 to a different platform and a different language, using different open-source software development tools.

a. Only the respective software sections for communicating with the headset or digital signal processing board are different; these do not show in the user interface.

Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface



Farwell Brain Fingerprinting 5.0 Brainwave Measurement User Interface



61. The brainwave analysis, and the output of the brainwave analysis, are identical for Farwell Brain Fingerprinting 3.0 and Farwell Brain Fingerprinting 5.0. (Farwell Brain Fingerprinting 4.0

contains all of the same analysis and output, plus several additional analysis algorithms and several additional algorithms for eliminating noise in the data.)

62. The Farwell Brain Fingerprinting 3.0 data analysis screen displays all of the essential output of the data analysis. It has the following design.

    a. Centered on the screen is a plot of the average brainwaves essentially identical to the plot of the same in the Brainwave Measurement User Interface 4.0 reproduced above. Brain responses to "Target," "Irrelevant," and "Probe" stimuli are plotted in the same respective colors, red, green, and blue as in all Farwell Brain Fingerprinting versions (and all BWS versions).

    b. Below that is a "Determination" regarding the outcome of the test. This is either "Information present" – the subject knows the information being tested, such as the details of a crime – or "information absent" – the subject does not know the tested information.

    c. Beside the determination is a statistical confidence (or "bootstrap index" in technical language), a number between 0% and 100%. This is the statistical probability that the determination is correct.

    d. Below that is a table containing the details of the results of the test. This is an essential table providing the scientist with needed information regarding these results. It has columns for the three stimulus types: "Targets," "Probes," and "Irrelevants." It has rows for counts of "Good" trials (free from noise); "Bad" trials (data contaminated with noise); "RTs" (average reaction time); and "Accuracy." This provides the same information as the corresponding table in the Brainwave Measurement User Interface.

63. Farwell Brain Fingerprinting 5.0 made the exact same computations for data analysis as Farwell Brain Fingerprinting 3.0. Farwell Brain Fingerprinting displayed the identical results in the user interface as 3.0, in the identical format.

64. All of the methods for elimination of noise in Farwell Brain Fingerprinting 5.0 were public domain and were copied directly from Farwell Brain Fingerprinting 3.0 and associated code and documents provided by Dr. Farwell to Dr. Maison.[10] Specifically with respect to elimination of noise, Dr. Maison translated Dr. Farwell's Fortran program FILTER.FOR for implementing the optimal digital filters into C # for Farwell Brain Fingerprinting 5.0. This is the exact same code, line for line, that was implemented in C++ in Farwell Brain Fingerprinting 3.0 and in the IDL language in Farwell Brain Fingerprinting 4.0. The "Range" algorithm is also identical in the Farwell Brain Fingerprinting 3.0, 4.0, and 5.0 codes, except for being implemented in a different language.

65. In creating the Farwell Brain Fingerprinting 5.0 Brainwave Analysis User Interface data display section, Dr. Maison made a nearly exact copy of the Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface .[11]

---

[10] In later versions of Farwell Brain Fingerprinting 5.0, Dr. Maison added an additional high-pass digital filter to counteract electrode drift. This is a standard public-domain filter that is well known and widely used in the signal-processing applications. It was not needed in 3.0 or 4.0 because this task was accomplished by hardware filters in the digital signal-processing board.

[11] Dr. Maison did not use the layout of Farwell Brain Fingerprinting 4.0 for Farwell Brain Fingerprinting 5.0, because 4.0 computed and displayed not only all of the information that is in 5.0, but also extensive information that was not included in 5.0. This included several additional algorithms for eliminating noise in the data and several different algorithms for

a. Centered at the top is the same brainwave plot, with "Target," "Irrelevant," and "Probe" brain responses plotted respectively in the same respective colors, red, green, and blue.

b. Below that is the same "Determination" as in 3.0, which is "Information Present" in the case displayed (or "Information Absent" in other cases).

c. Below that is the exact same table as in 3.0, except that the rows and columns are reversed and the same information in the single table in 3.0 is divided into two tables in 5.0.

i. "Targets," "Probes," and "Irrelevants" are columns in 3.0 and rows in 5.0. Columns for "Captured trials," "Analyzed trials," and "Rejected trials" (in 5.0) tabulate respectively the identical items, labeled "Total," "Good," and "Bad" trials (in 4.0).

ii. "Accuracy" and "Reaction Time" are columns in 5.0 and rows in 4.0.

d. In copying the Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface to Farwell Brain Fingerprinting 5.0, Dr. Maison changed the background color from blue to green, as is discussed elsewhere in this document.

66. The Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface and the Farwell Brain Fingerprinting 5.0 Brainwave Analysis User Interface Data Display Section both included the following exact same items:

a. A brainwave plot with the three types of brain responses displayed in the same respective colors and format;

b. Two summary results, a Determination and a Statistical Confidence, displayed in the same format.

c. Tables with a total of 30 cells, all containing the same information in 3.0 and 5.0, with minor differences in the layout (rows and columns reversed).

67. In summary, the Brainwave Analysis User Interfaces for Farwell Brain Fingerprinting 3.0 and 5.0 are virtually identical.

a. However, Dr. Maison changed the background color from blue in 3.0 to green in 5.0.

68. Before producing Farwell Brain Fingerprinting 5.0, Dr. Maison developed another version, the Dr. Maison BWS Software, that was almost identical to Brain Fingerprinting 3.0 and 5.0, with the differences described below.

69. All of the methods, algorithms and computations for the two functions of the program, Brainwave Measurement and Brainwave Analysis, were identical in the Dr. Maison BWS Software to Farwell Brain Fingerprinting 3.0 and 5.0. This is because Dr. Maison did the same thing to produce the Dr. Maison BWS Software as he did to produce 5.0: He ported Dr. Farwell's code from Farwell Brain Fingerprinting 3.0 and 4.0 and associated detailed specifications, patents, and publications to a different language – C # – and a different environment – Microsoft Visual Studio and Microsoft .NET – and used different open-source

computing the statistical results. Thus, the display section of 4.0 was much more extensive and complicated than 3.0 and 5.0.

software tools. The language, environment, and tools for the Dr. Maison BWS Software were identical to those of Farwell Brain Fingerprinting 5.0.

70. The one segment of the Dr. Maison BWS code that was not open source and was not ported from Farwell Brain Fingerprinting 4.0 was the code that interfaced with the headset used by BWS, which was manufactured in Taiwan. Since the digital signal processors and communication protocols in this headset were different from the ones previously used by Dr. Farwell – and from other headsets and digital signal processors from other companies – Dr. Maison wrote custom code for interfacing with the Taiwanese headset that became a part of the Dr. Maison BWS Software system.

71. Dr. Maison's task in porting Farwell Brain Fingerprinting 4.0 to Dr. Maison BWS Software involved integration or stitching together of open-source software from various sources. This integration task is accomplished according to a blueprint or software development specifications. The integration task performed by Dr. Maison in porting Farwell Brain Fingerprinting 4.0 to Dr. Maison BWS Software was specified in detail in the open-source Brain Fingerprinting Measurement Specifications (Exhibit CAA) and the open-source Brain Fingerprinting Analysis Specifications (Exhibit CAB) provided by Dr. Farwell to Dr. Maison, as well as in the structure and integration of Farwell Brain Fingerprinting 4.0 and 3.0, which was also provided to Dr. Maison by Dr. Farwell. The integration or stitching together performed by Dr. Maison in developing Dr. Maison BWS Software was in the public domain and open source.

72. The user interfaces for the two functions of the program, Brainwave Measurement and Brainwave Analysis, were also virtually identical between Farwell Brain Fingerprinting 3.0, 5.0, and the Dr. Maison BWS Software. This is because Dr. Maison copied the user interfaces for Brainwave Measurement and Brainwave Analysis from Farwell Brain Fingerprinting 3.0 to the Dr. Maison BWS Software, just as he did for Brain Fingerprinting 5.0.

73. There was one major difference between the Dr. Maison BWS Software that Dr. Maison provided to Brainwave Science and the Farwell Brain Fingerprinting 5.0 software that Dr. Maison provided to Dr. Farwell. That is, the software sections for communicating with the two respective headsets used by the two programs were totally different, because BWS and Dr. Farwell used two totally different headsets. In both cases, this is the only part of the software that is not in the public domain.

74. Dr. Maison did not give Dr. Farwell the section of the Dr. Maison BWS Software that communicated with the headset, since the Farwell Brain Fingerprinting 5.0 system used a totally different headset. The rest of the Dr. Maison BWS Software and Farwell Brain Fingerprinting 5.0 were extremely similar – and in the open-source public domain – as both resulted from Dr. Maison porting and translating Farwell Brain Fingerprinting 3.0 and 4.0 to the respective newer versions, Farwell Brain Fingerprinting 5.0 and the Dr. Maison BWS Software.

75. All of the methods for eliminating noise in the signal in the Dr. Maison BWS Software were the same public-domain methods from Farwell Brain Fingerprinting 3.0 and 4.0 that Dr. Maison implemented in Farwell Brain Fingerprinting 5.0.

76. There were a few minor differences between Farwell Brain Fingerprinting 5.0 and the Dr. Maison BWS Software, as follows.

a. The Dr. Maison BWS Software measured, computed, and displayed only one EEG channel, whereas Farwell Brain Fingerprinting 5.0 measured, computed, and displayed three EEG channels. Both measured one eye-movement (EOG) channel. Therefore there were two channels total displayed in the average brain response plots for the Dr. Maison BWS Software and four channels total displayed in the corresponding brainwave displays in Farwell Brain Fingerprinting 5.0.

b. Although both the Dr. Maison BWS Software and Farwell Brain Fingerprinting 5.0 applied the optimal digital filters – which Maison translated from Dr. Farwell's FILTER.FOR program – in the Brainwave Analysis, only Brain Fingerprinting 5.0 applied these filters in the Brainwave Measurement. This resulted in clearer EEG displays in Farwell Brain Fingerprinting 5.0 than in the Dr. Maison BWS Software.

c. In later versions of Brain Fingerprinting 5.0, Dr. Maison implemented one additional algorithm for eliminating noise in the data that was not included in the Dr. Maison BWS Software, namely a high-pass digital filter for eliminating electrode drift.

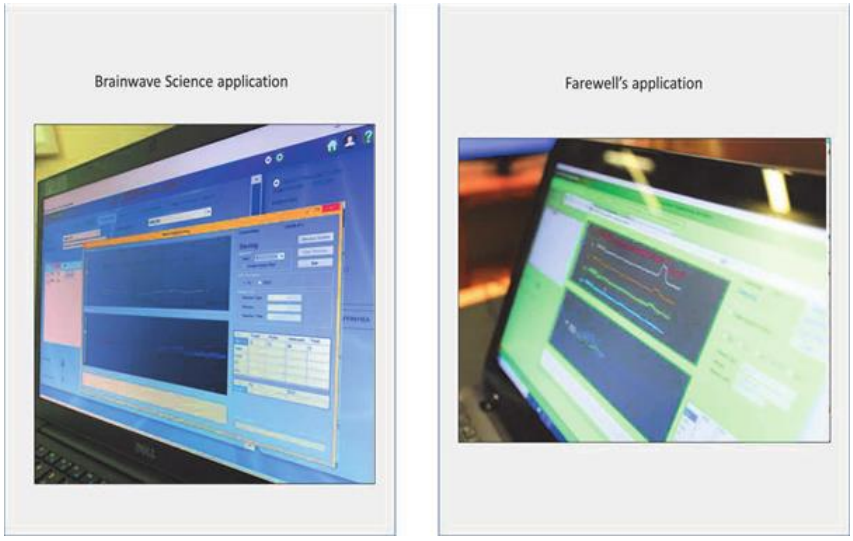
77. Other than the above minor differences, the user interfaces for the Dr. Maison BWS Software for both functions, Brainwave Measurement and Brainwave Analysis, were identical to the user interfaces for the same in Farwell Brain Fingerprinting 3.0 and 5.0. This is because Dr. Maison copied the Farwell Brain Fingerprinting 3.0 interfaces for both Farwell Brain Fingerprinting 5.0 and the Dr. Maison BWS Software. All the brainwave measurements and computations that produced the results displayed were also identical for Farwell Brain Fingerprinting 3.0, Farwell Brain Fingerprinting 4.0, Farwell Brain Fingerprinting 5.0, and the Dr. Maison BWS Software.

78. Like all Farwell Brain Fingerprinting versions – and all software for brainwave-based detection of concealed information, and in fact all software for measuring P300 or any other event-related brain potentials – the Dr. Maison BWS Software had multiple data-entry screens, the purpose of which was for the user to enter details such as the subject name and number, the words to be displayed, etc. All of this is in the public domain. The appearance of these displays depends on which open-source software tools are used for the data entry functions. Since Farwell Brain Fingerprinting 5.0 and the Dr. Maison BWS Software used the same open-source tools to perform the same open-source data entry tasks, the displays were similar. Nothing in these data-entry screens or keyboards for data entry could be considered proprietary.

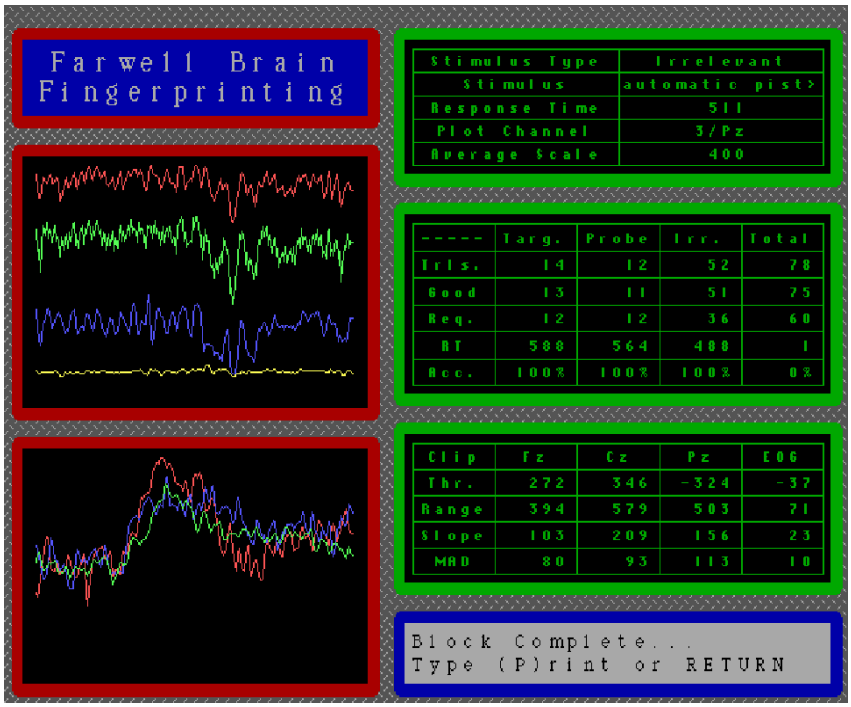
79. There was one noticeable difference between the user interfaces for Farwell Brain Fingerprinting 3.0 and the Dr. Maison BWS Software on the one hand, and Farwell Brain Fingerprinting 5.0 on the other. The Dr. Maison BWS Software retained the blue background of Farwell Brain Fingerprinting 3.0 and 4.0 user interfaces. For Brain Fingerprinting 5.0, Dr. Maison changed the background color to green.

80. The following illustrates that the Dr. Maison BWS Software Brainwave Measurement user interface, like the Farwell Brain Fingerprinting 5.0 Brainwave Measurement user interface, was copied almost exactly from the Farwell Brain Fingerprinting 4.0 Brainwave Measurement user interface. This graphic is from Plaintiff's EFS 20-2, Exhibit B. "Farwell's application" refers to Neurodyne / Farwell Brain Fingerprinting 5.0, the Maison BWS Software.

From Plaintiff's Exhibit B



Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface



81. Comparing Farwell Brain Fingerprinting 4.0 Brainwave Measurement user interface with the Maison BWS Brainwave Measurement user interface reveals the following.

82. For both measuring brainwaves and analyzing brainwaves, the Dr. Maison BWS Software included all the same computations as Farwell Brain Fingerprinting 4.0 and 3.0. The only difference was the programming language and the corresponding development platform. The Dr. Maison BWS Software was simply Farwell Brain Fingerprinting 4.0 ported and translated to a new platform and a new language, using different open-source programming tools.

83. For brainwave measurements, the output of these functions and algorithms was displayed on the Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface and the Dr. Maison BWS Software Brainwave Measurement User Interface. **Both of these have the <u>identical</u> following design.**

    a. At the upper left is a plot of the ongoing brainwaves. Farwell Brain Fingerprinting 4.0 displays four channels from four scalp locations. One of these is the eye-movement (EOG) channel, and three are EEG from three scalp locations, named Fz, Cz, and Pz. In the Dr. Maison BWS Software, there are only two channels, one EEG at Pz and one EOG.

    b. Below that is a plot of the average brain responses to three types of stimuli (words or pictures presented to the subject). Brain responses to "target," "irrelevant," and "probe" are plotted respectively with red, green, and blue lines. These are the standard colors used in all Farwell Brain Fingerprinting versions. Plots are identical in Farwell Brain Fingerprinting 4.0 and Dr. Maison BWS Software.

    c. In both versions, at the upper right is a table that lists the following essential output: the type of stimulus, the stimulus, and the reaction time. (In Farwell Brain Fingerprinting 4.0 this table also has two non-essential items, the number of the channel being displayed in the brainwave plots and the scale of the plots).

    d. Below that in both versions is a table that has columns for three stimulus types: Target, Probe, and Irrelevant. It has rows for the following:

        i. Trials (total number of trials; a trial is comprises one stimulus presentation and the corresponding brain responses);

        ii. Good trials (total number of trials that do not have noise in the data);

        iii. Required trials (number of trials required to complete the test);

        iv. RT or Reaction Time (the subject's average button-press response time);

        v. Accuracy (the percentage accuracy of the subject's button presses).

    e. Below that is a table that tabulates the result of the algorithms for eliminating noise from the data. In Farwell Brain Fingerprinting 4.0 the columns are the four channels; i.e., three EEG channels and one eye-movement (EOG) channel. In the Dr. Maison BWS Software there are only two channels. The rows display the numbers for the different algorithms for eliminating noise. For Farwell Brain Fingerprinting 4.0 these comprise the standard "Range" algorithm plus four additional ones: "Clip," "Threshold," "Slope," and "MAD." (These are described above.) In the Dr. Maison BWS Software, only one method, "Range," is applied and displayed.

i. With respect to eliminating noise, the Dr. Maison BWS Software includes nothing other than what is already in Farwell Brain Fingerprinting 4.0. Farwell Brain Fingerprinting 4.0 also includes four more advanced methods that are not included in Dr. Maison BWS Software.

84. The Maison BWS Brainwave Measurement User Interface is identical to the Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface in all essential features. Even the standard Farwell Brain Fingerprinting colors for the "Target," "Probe," and "Irrelevant" brainwave plots are identical. All of the tables display the same information in both versions.

85. The only differences are trivial and not related to the essential functions and data displayed, as follows: minor cosmetic differences like the color of the background and the relative size of the plots; a couple different navigation buttons; an extra non-essential channel plotted in the ongoing brainwaves in 5.0; and the number of rows in the table on noise-elimination algorithms. (The Farwell Brain Fingerprinting 4.0 table has four rows corresponding to the four noise-elimination algorithms, and the Dr. Maison BWS table has only one row because only the standard "Range" algorithm was implemented in it.)

86. The Farwell Brain Fingerprinting 4.0 interface and the Maison BWS Brainwave Measurement user interfaces contain 5 identical plots of brainwaves and 38 identical entries in tables. (Two additional brainwave channels are included in Farwell Brain Fingerprinting 4.0 displays, because it measured 3 channels of EEG and the Dr. Maison BWS Software measured only one.) Farwell Brain Fingerprinting 4.0 contains three additional rows of algorithms for eliminating noise that are not included in the Dr. Maison BWS Software. Each of the two contains 2 – 3 additional buttons for navigation or adjustment.

87. In summary, the respective brainwave-measurement functions and algorithms are identical for Farwell Brain Fingerprinting 4.0 and the Dr. Maison BWS Software. The user interfaces for Farwell Brain Fingerprinting 4.0 and the Dr. Maison BWS Software report all of the same data (except for the fewer EEG channels and fewer algorithms for eliminating noise in the data in the Maison BWS software). The two programs display the data in virtually identical ways. This is because Dr. Maison copied Dr. Farwell's Farwell Brain Fingerprinting 4.0 code, user interface, and detailed specifications – which were also included in Dr. Farwell's patents and prior scientific publications – in developing the Dr. Maison BWS Software. The Dr. Maison BWS Software comprised simply porting Farwell Brain Fingerprinting 4.0 to a different platform and a different language, using different open-source software development tools.

a. Only the respective software sections for communicating with the headset or digital signal processing board are different between Farwell Brain Fingerprinting 4.0 and the Dr. Maison BWS Software; these do not show in the user interface.

88. In creating the Maison BWS Brainwave Analysis User Interface data display section, Dr. Maison made a nearly exact copy of the Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface .[12]

[12] Dr. Maison did not use the layout of Farwell Brain Fingerprinting 4.0 for Farwell Brain Fingerprinting 5.0, because 4.0 computed and displayed not only all of the information that is in 5.0, but also extensive information that was not included in 5.0. This included several additional algorithms for eliminating noise in the data and several different algorithms for computing the statistical results. Thus, the display section of 4.0 was much more extensive and complicated than 3.0 and 5.0.

a. Centered at the top is the same brainwave plot, with "Target," "Irrelevant," and "Probe" brain responses plotted respectively in the same respective colors, red, green, and blue.

b. Below that is the same "Determination" as in 3.0, which is "Information Present" in the case displayed (or "Information Absent" in other cases).

c. Below that is the exact same table as in 3.0, except that the rows and columns are reversed and the same information in the single table in 3.0 is divided into two tables in Dr. Maison BWS.

   i. "Targets," "Probes," and "Irrelevants" are columns in 3.0 and rows in Dr. Maison BWS. Columns for "Captured trials," "Analyzed trials," and "Rejected trials" (in Dr. Maison BWS) tabulate respectively the identical items, labeled "Total," "Good," and "Bad" trials (in 3.0).

   ii. "Accuracy" and "Reaction Time" are columns in Dr. Maison BWS and rows in Farwell Brain Fingerprinting 3.0.

d. In copying the Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface to Dr. Maison BWS, Dr. Maison did NOT change the background color from blue to green, as is discussed elsewhere in this document. The background color for the user interface for Dr. Maison BWS is blue.

89. The Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface and the Dr. Maison BWS Brainwave Analysis User Interface Data Display Section both included the following exact same items:

a. A brainwave plot with the three types of brain responses displayed in the same respective colors and format;

b. Two summary results, a Determination and a Statistical Confidence, displayed in the same format.

c. Tables with a total of 30 cells, all containing the same information in Farwell Brain Fingerprinting 3.0 and Dr. Maison BWS, with minor differences in the layout (rows and columns reversed).

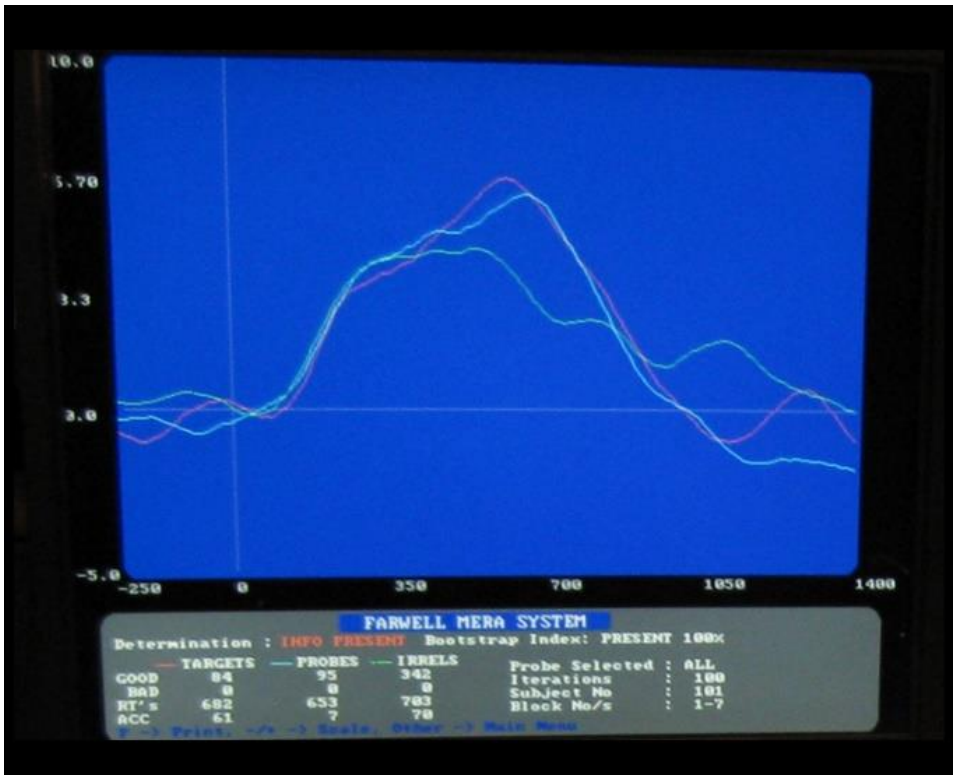
90. In summary, the Brainwave Analysis User Interfaces for Farwell Brain Fingerprinting 3.0 and Dr. Maison BWS are virtually identical.

a. Unlike Farwell Brain Fingerprinting 5.0, Dr. Maison did NOT change the background color from blue in 3.0 to green in Dr. Maison BWS. Dr. Maison BWS user interface has a blue background color.

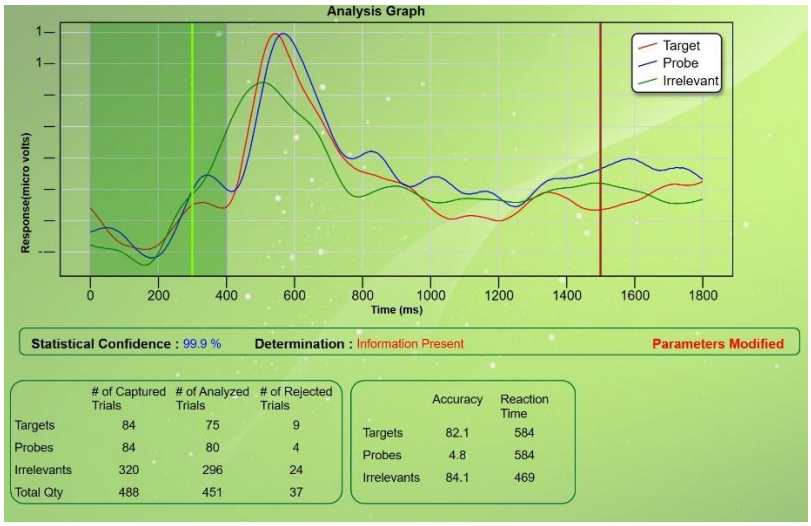
91. The exhibits to Plaintiff's CEO Ika's Affidavit (EFS #20-2) that contain the screenshots of the BWS software do not include a screenshot of the Dr. Maison BWS Software Brainwave Analysis User Interface or the corresponding user interface in the software that BWS submitted to Codequiry as its code. The below analysis is based on Farwell Brain Fingerprinting 5.0, which is believed to be very similar to the Dr. Maison BWS Software that Dr. Maison downloaded from a public source on the internet (EFS #106-3, Exhibit A, p. 11 – 12), except that in the below version the background color has been changed from blue to green by Dr. Maison in producing Farwell Brain Fingerprinting 5.0 ("Dr. Larry Farwell's Application"). The corresponding user interface in the code that BWS submitted to Codequiry was also changed from blue to green – fraudulently – after BWS obtained a copy

of Dr. Farwell's software from Dr. Maison and modified the Dr. Maison BWS Software to make it more similar to Dr. Larry Farwell's Application by changing the background color from blue to green (and other undisclosed modifications).

Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface - Data Display Section



Dr. Maison BWS Software Brainwave Analysis User Interface - Data Display Section



92. The brainwave analysis, and the output of the brainwave analysis, are identical for Farwell Brain Fingerprinting 3.0 and Dr. Maison BWS Software. (Farwell Brain Fingerprinting 4.0 contains all

of the same analysis and output, plus several additional analysis algorithms and several additional algorithms for eliminating noise in the data.)

93. In creating the Dr. Maison BWS Software Brainwave Analysis User Interface data display section, Dr. Maison made a nearly exact copy of the Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface

    a. Centered at the top is the same brainwave plot, with "Target," "Irrelevant," and "Probe" brain responses plotted respectively in the same colors, red, green, and blue.

    b. Below that is the same "Determination" as in 3.0, which is "Information Present" in the case displayed (and "Information Absent" in other cases).

    c. Below that is the exact same table as in 3.0, except that the rows and columns are reversed and the same information in the single table in 3.0 is divided into two tables in Dr. Maison BWS Software.

        i. "Targets," "Probes," and "Irrelevants" are columns in 3.0 and rows in Dr. Maison BWS Software. Columns for "Captured trials," "Analyzed trials," and "Rejected trials" (in Dr. Maison BWS Software) tabulate respectively the identical items, labeled "Total," "Good," and "Bad" trials (in Farwell Brain Fingerprinting 3.0).

        ii. "Accuracy" and "Reaction Time" are columns in Dr. Maison BWS Software and rows in Farwell Brain Fingerprinting 3.0.

    d. In copying the Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface to Dr. Maison BWS Software, Dr. Maison did not change the background color from blue to green. The Dr. Maison BWS Software maintained the blue background of Farwell Brain Fingerprinting 3.0.

94. The Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface and the Dr. Maison BWS Brainwave Analysis User Interface Data Display Section both include the following exact same items:

    a. A brainwave plot with the three types of brain responses displayed in the same respective colors and format;

    b. Two summary results, a Determination and a Statistical Confidence, displayed in the same format.

    c. Tables with a total of 30 cells, all containing the same information in Farwell Brain Fingerprinting 3.0 and Dr. Maison BWS Software, with minor differences in the layout (rows and columns reversed).

95. In summary, the respective brainwave-analysis functions and algorithms are identical for Farwell Brain Fingerprinting 3.0 and the Dr. Maison BWS Software. The user interfaces for Farwell Brain Fingerprinting 3.0 and the Dr. Maison BWS Software report all of the same data. The two programs display the data in virtually identical ways. This is because Dr. Maison copied Dr. Farwell's Farwell Brain Fingerprinting 3.0 code and detailed specifications – which were also included in Dr. Farwell's patents and prior scientific publications – in developing the Dr. Maison BWS Software. The Dr. Maison BWS Software comprised simply porting Farwell Brain Fingerprinting 4.0 and the data analysis section of 3.0 to a different platform and a different language, using different open-source software development tools.

a. Only the respective software sections for communicating with the headset or digital signal processing board are different between Farwell Brain Fingerprinting 3.0 and the Dr. Maison BWS Software; these do not show in the user interface.

96. Farwell Brain Fingerprinting 5.0 was also known as Neurodyne. The Neurodyne program is integrated into the Microsoft Visual Studio and Microsoft .NET environments and stored in Dr. Maison's TFS. Dr. Maison provided Dr. Farwell access to Farwell Brain Fingerprinting 5.0 by allowing Dr. Farwell access to Dr. Maison's TFS.

97. After the current lawsuit was filed, Dr. Maison revoked Dr. Farwell's access to Dr. Maison's TFS. Consequently, Dr. Farwell no longer has access to Farwell Brain Fingerprinting 5.0. The only way to access it is for Dr. Maison to provide access to his TFS to someone, in this case Mindfire.

98. 100% of the Neurodyne program comprises implementation by Dr. Maison of Dr. Farwell's pre-existing open-source material – including Farwell Brain Fingerprinting 3.0 and 4.0, detailed specifications provided to Dr. Maison by Dr. Farwell, and Dr. Farwell's patents and scientific publications – with one exception. The exception is the code Dr. Maison developed to communicate with the Cognionics headset. This is custom code.

99. The Farwell Brain Fingerprinting 5.0 / Neurodyne code provided to Dr. Farwell by Dr. Maison does not include any code for communicating with any other headset or digital signal processor, other than the code for communicating with the Cognionics headset.

100. As a preparation for performing its two functions of Brainwave Measurement and Brainwave Analysis, the program must have identifying information about the subject (subject number, name, etc.) and information regarding what words or pictures ("stimuli") will be displayed to elicit the brainwave responses. These are input through a standard keyboard and data entry screens. The appearance of the data entry user-interface screens will vary depending on which open-source software packages are used for this purpose. Data entry is essentially the same for all programs for detection of concealed information, and for that matter for almost all programs that involve any kind of measurements of EEG or any other measurements related to cognitive processing. There is nothing that might be construed as proprietary in this data-entry process or the software and user interfaces it involves.

101. Similarly, virtually all software programs have navigation pages, tabs, navigation buttons, etc. that allow the user to access and activate the actual functions of the program – in this case, the two functions of measuring brainwaves and analyzing brainwaves. All versions of Farwell Brain Fingerprinting and all versions of Brainwave Science software have such navigation pages, tabs, navigation buttons, etc. All of these are similar in function. They differ in appearance in the different programs depending on the open-source software used to implement them. All of this is in the public domain, and none of these ancillary navigation pages could be considered proprietary.

102. Since both Farwell Brain Fingerprinting 5.0 and Dr. Maison BWS Software were ported from the same source, Farwell Brain Fingerprinting 3.0 (brainwave analysis) and 4.0 (brainwave measurement), and both programs were ported to the same platform and language with the same open-source development tools, the data entry screens and the navigation screens inevitably look very similar for Farwell Brain Fingerprinting 5.0 and Dr. Maison BWS Software. These are all common screens found in a multitude of programs, are all public domain, and could in no way be considered proprietary.

103. The Dr. Maison BWS Software was released to a public domain source at 6:15 PM on 9/10/2017 from IP address 65.52.55.39 in Chicago, using the credentials of Ika's employee Karuna Raja, who was in Southborough, MA at the time (EFS #87). This is documented with screenshots in Exhibit CAD to this document.

104. Dr. Maison later downloaded this software from a public source (EFS #106-3, Exhibit A, p. 11 – 12.). Thus, all of the Dr. Maison BWS Software that Dr. Maison used for any purpose was and is in the public domain. This fact shall be set aside in the below discussion, which will proceed on the premise that not all of the Dr. Maison BWS Software was in the public domain.

105. Plaintiff's CEO Ika initially stated under oath in a hearing in this case on November 30, 2021 that none of the Dr. Maison BWS Software was public domain or open source. Plaintiff now acknowledges that Ika lied under oath, and in fact 90% of the Maison BWS Software is open source (Tomkins Affirmation, Exhibit A, 37:9-37:12).

106. 100% of the software that Dr. Maison provided to Dr. Farwell for Farwell Brain Fingerprinting 5.0 is open source, due to Dr. Maison having deleted the proprietary portion of the Dr. Maison BWS software before providing software to Dr. Farwell. (This remains true regardless of whether or not Dr. Maison downloaded Dr. Maison BWS Software from a public source on the internet, as he has stated.) (Tomkins Affirmation, Exhibit A, 7:8-24)

107. Plaintiff has maintained Dr. Maison BWS Software in its possession in BWS' TFS repository since Dr. Maison originally created it (BWS TFS).

108. Plaintiff BWS obtained a copy of Farwell Brain Fingerprinting 5.0 (also known as Neurodyne and Dr. Larry Farwell's Application) from Dr. Maison (Ika Affidavit, EFS 20-2 p. 6 par 22).

109. Plaintiff Modified the Dr. Maison BWS code (later called iCognative by BWS) and user interface to look more similar to the Farwell Brain Fingerprinting 5.0 / Dr. Larry Farwell's Application user interface. Specifically, the Maison BWS Software had a user interface with a blue background. Plaintiff modified the Dr. Maison BWS code produced by Dr. Maison. This modification produced a new software version, the Fraudulently Modified BWS Software. The modifications were specifically designed to make this software look more similar to Dr. Larry Farwell's Application, Brain Fingerprinting 5.0.

110. Plaintiff then submitted the Fraudulently Modified BWS Software, aka "iCognative," to a software analysis in Codequiry.

111. Before submitting the code to Codequiry, BWS also eliminated sections of the code that were totally different between the Fraudulently Modified BWS Software and Dr. Larry Farwell's Application, Farwell Brain Fingerprinting 5.0, namely the parts that communicated with the two different respective headsets. These also were the only parts of the code that were proprietary and not open source and public domain.

112. Plaintiff falsely and fraudulently stated that the Codequiry comparison was between software developed by BWS (i.e., the Dr. Maison BWS Software) and Dr. Larry Farwell's Application, Farwell Brain Fingerprinting 5.0, whereas in fact the comparison was between the Fraudulently Modified BWS Software – modified to look more similar to Dr. Larry Farwell's Application, Farwell Brain Fingerprinting 5.0 after BWS obtained it from Dr. Maison.

113. The software analysis in Codequiry showed a high degree of similarity between the Fraudulently Modified BWS Software and Dr. Larry Farwell's Application, Farwell Brain Fingerprinting 5.0. There are two reasons for this.

a. Everything (except the section that communicated with the headset) in the Dr. Maison BWS Software, of which the Fraudulently Modified BWS was a modification, was in the public domain, and was obtained by Dr. Maison from Dr. Farwell in the form of Farwell Brain Fingerprinting 3.0 and 4.0, the Brain Fingerprinting Specifications, and Dr. Farwell's patents and scientific publications. Dr. Larry Farwell's Application, Farwell Brain Fingerprinting 5.0, was developed by Dr. Maison from of the same public domain sources. Both the Dr. Maison BWS Software and Farwell Brain Fingerprinting 5.0 were developed by Dr. Maison porting Farwell Brain Fingerprinting 3.0 and 4.0 to a new platform and language.

b. BWS modified the Dr. Maison BWS Software to produce the Fraudulently Modified BWS Software specifically to make it appear more similar to Dr. Larry Farwell's Application, Farwell Brain Fingerprinting 5.0, in particular by changing the background color from blue to green.

114. If the Codequiry analysis had been conducted on the Dr. Maison BWS Software, rather than the Fraudulently Modified BWS Software, and conducted on all of the software rather than only part of the software – by BWS omitting the parts that were clearly different – the results would undoubtedly have been different.

115. Plaintiff stated that they had located an online demonstration where Dr. Farwell demonstrated software with a nearly identical user interface to that of BWS' Software (Ika affidavit doc 20-2), and cited this as evidence that Dr. Farwell had received stolen BWS software from Dr. Maison. For both of the functions of all versions of BWS' Software, the user interfaces are identical to Farwell Brain Fingerprinting 4.0 for Brainwave Measurement and Farwell Brain Fingerprinting 3.0 for Brainwave Analysis. Dr. Farwell developed Farwell Brain Fingerprinting 3.0 and 4.0 before Brainwave Science was founded in 2012. Both of these were in the public domain.

116. Dr. Farwell conducted online demonstrations of Farwell Brain Fingerprinting 3.0 and 4.0 between 1999 and 2011 – before BWS existed – that presented user interfaces that were identical to the Dr. Maison BWS Software and the BWS Fraudulently Modified Software (except for minor cosmetic differences like the background color). The following are online demonstrations of software with identical user interfaces to the BWS software, for both of the functions of the software, Brainwave Measurement and Brainwave Analysis, that were online before BWS existed.

a. CBS 60 Minutes https://www.youtube.com/watch?v=4KivDqinwbs

b. ABC Good Morning America https://www.youtube.com/watch?v=KnjzFdxIKCM

c. KOMO News https://www.youtube.com/watch?v=1Co8JC7Qk84

d. PBS https://www.youtube.com/watch?v=LKdCEvdBqJA

e. Fox News https://www.youtube.com/watch?v=AKnNEB6uwec

f. Discovery Channel "Wild Tech" https://www.youtube.com/watch?v=1Q9BfAVM5os

g. Discovery Channel Science https://www.youtube.com/watch?v=mLnVvXGrDdc

h. Fox 5 News https://www.youtube.com/watch?v=Mz1ZrKFsjzQ

i. CNN https://www.youtube.com/watch?v=Qwme8wiUTu8

j. BBC https://www.youtube.com/watch?v=RTS_b_SacI4

k. Seattle Post Intelligencer https://farwellbrainfingerprinting.com/brain-fingerprinting-touted-as-truth-meter/

l. Chemistry and Industry https://farwellbrainfingerprinting.com/chemistry-and-industry-on-farwell-brain-fingerprinting/

117. For Brainwave Measurement, the above online demonstrations from before Brainwave Science existed had the following identical features with the BWS Software.

118. For brainwave measurements, Dr. Farwell's online demonstrations of Farwell Brain Fingerprinting 4.0 from before Brainwave Science existed displayed the following on the Brainwave Measurement User Interface screen.

a. At the upper left is a plot of the ongoing brainwaves in four channels from four scalp locations. One of these is the eye-movement channel, and three are EEG from three scalp locations, named Fz, Cz, and Pz.

b. Below that is a plot of the average brain responses to three types of stimuli (words or pictures presented to the subject). Brain responses to "target," "irrelevant," and "probe" are plotted respectively with red, green, and blue lines. These are the standard colors used in all Farwell Brain Fingerprinting versions.

c. At the upper right is a table that lists the following essential output: the type of stimulus, the stimulus, and the reaction time. (This table also has two non-essential items, the number of the channel being displayed in the brainwave plots and the scale of the plots).

d. Below that is a table that has columns for three stimulus types: Target, Probe, and Irrelevant. It has rows for the following:

i. Trials (total number of trials; a trial is comprises one stimulus presentation and the corresponding brain responses);

ii. Good trials (total number of trials that do not have noise in the data);

iii. Required trials (number of trials required to complete the test);

iv. RT or Reaction Time (the subject's average button-press response time);

v. Accuracy (the percentage accuracy of the subject's button presses).

e. Below that is a table that tabulates the result of the algorithms for eliminating noise from the data. The columns are the four channels; i.e., three EEG channels and one eye-movement (EOG) channel. The rows display the numbers for the different algorithms for eliminating noise. These comprise the standard "Range" algorithm plus four additional ones: "Clip," "Threshold," "Slope," and "MAD." (These are described above in paragraph 20.)

119. The BWS Software Brainwave Measurement User Interface (all versions) is identical to the Farwell Brain Fingerprinting 4.0 Brainwave Measurement User Interface in the above online demonstrations from before Brainwave Science existed in all essential features. Even the standard Farwell Brain Fingerprinting colors for the "Target," "Probe," and "Irrelevant" brainwave plots are identical.

a. The only differences are trivial and not related to the essential functions and data displayed, as follows: minor cosmetic differences like the color of the background and

the relative size of the plots; a couple different navigation buttons; and the number of rows in the table on noise-elimination algorithms. (The online demonstration table has four rows corresponding to the four noise-elimination algorithms, and the BWS table has only one row because only the standard "Range" algorithm was implemented in the BWS Software.)

120. The Farwell Brain Fingerprinting 4.0 demonstrated online before BWS existed and BWS Brainwave Measurement User interfaces contain 7 identical plots of brainwaves and 38 identical entries in tables. Farwell Brain Fingerprinting 4.0 contains three additional rows of algorithms for eliminating noise that are not included in BWS. Each of the two contains 2 – 3 additional buttons for navigation or adjustment.

121. For Brainwave Analysis, the above online demonstrations from before Brainwave Science existed had the following identical features with the BWS Software.

122. BWS Software Brainwave Analysis User Interface data display section and the Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface displayed in the above online demonstrations from before Brainwave Science existed had the following identical features.

a. Centered at the top is the same brainwave plot, with "Target," "Irrelevant," and "Probe" brain responses plotted respectively in the same colors, red, green, and blue.

b. Below that is the same "Determination" as in 3.0, which is "Information Present" in the case displayed in 3.0 and "Information Absent" in the case displayed in Dr. Maison BWS Software.

c. Below that is the exact same table as in 3.0 as displayed online and Dr. Maison BWS Software, except that the rows and columns are reversed and the same information in the single table in 3.0 is divided into two tables in Dr. Maison BWS Software.

i. "Targets," "Probes," and "Irrelevants" are columns in 3.0 online demonstrations and rows in Dr. Maison BWS Software. Columns for "Captured trials," "Analyzed trials," and "Rejected trials" (in Dr. Maison BWS Software) tabulate respectively the identical items, labeled "Total," "Good," and "Bad" trials (in Farwell Brain Fingerprinting 3.0).

ii. "Accuracy" and "Reaction Time" are columns in Dr. Maison BWS Software and rows in Farwell Brain Fingerprinting 3.0 online demonstrations.

123. The Farwell Brain Fingerprinting 3.0 Brainwave Analysis User Interface as it appeared in online demonstrations before BWS existed and the BWS Brainwave Analysis User Interface Data Display Section both include the following exact same items, in the same layout on the page:

a. A brainwave plot with the three types of brain responses displayed in the same respective colors and format;

b. Two summary results, a Determination and a Statistical Confidence, displayed in the same format.

c. Tables with a total of 30 cells, all containing the same information in Farwell Brain Fingerprinting 3.0 and Dr. Maison BWS Software, with minor differences in the layout (rows and columns reversed).

124. With respect to purported new developments in software by Brainwave Science, the "Undisputed Facts" in BWS' Statement of Undisputed Material Facts (EFS #106-1) refer only to

the false claim that BWS developed methods for eliminating noise from the signals. In Ika's Affidavit he makes additional false claims regarding developments by BWS. Ika stated the following Ika Affidavit, EFS 20-2, p. 4, par. 10 – 11.

> 10. The challenge in developing and marketing any P300 based system lies not within the concept of P300 measurement itself but in creating a system which, among other things,
>
> a) prompts testing personnel for appropriate stimuli;
>
> b) displays stimuli to testing subjects in optimal order and at optimal intervals;
>
> c) captures appropriate P300 brainwave responses;
>
> d) disregards and/or eliminates extraneous responses ("noise") which may produce false positive or false negative results;
>
> e) detects and disregards any attempted countermeasures by suspects or others involved in conducting testing;
>
> f) performs appropriate analysis of P300 measured responses utilizing statistical and machine learning algorithms and Artificial Intelligence;
>
> g) generates unbiased reports for use by examiners, investigating agencies and legal authorities.
>
> 11. Brainwave has expended substantial time and resources to address the afore-referenced challenges by developing proprietary software code, user interfaces, algorithms and hardware ("Brainwave Trade Secrets") to create a system that is accurate, scalable and more-readily utilized by field investigators without extensive scientific training.

125. All of the above claims by Ika are demonstrably and unequivocally false, as follows.

a. "prompts testing personnel for appropriate stimuli;" is contained in Farwell Brain Fingerprinting 3.0 and 4.0, the Brain Fingerprinting Specifications, and Dr. Farwell's patents and scientific publications (Farwell's Dropbox) in at least as comprehensive a manner as in Dr. Maison BWS Software (BWS TFS).

b. "displays stimuli to testing subjects in optimal order and at optimal intervals;" is contained in Farwell Brain Fingerprinting 3.0 and 4.0, the Brain Fingerprinting Specifications, and Dr. Farwell's patents and scientific publications (Farwell's Dropbox) in at least as comprehensive a manner as in Dr. Maison BWS Software (BWS TFS). This is also found in many of the over 800 other published scientific publications wherein other scientists have discussed and replicated Dr. Farwell's Brain Fingerprinting research and results (https://scholar.google.com/citations?user=wgZhgc0AAAAJ&hl=en).

c. "captures appropriate P300 brainwave responses;" is contained in Farwell Brain Fingerprinting 3.0 and 4.0, the Brain Fingerprinting Specifications, and Dr. Farwell's patents and scientific publications (Farwell's Dropbox) in at least as comprehensive a manner as in Dr. Maison BWS Software (BWS TFS). This is also found in many of the over 4,000 other published scientific publications wherein other scientists have discussed and replicated Dr. Farwell's research and results on several different applications of the P300.

d. "disregards and/or eliminates extraneous responses ("noise") which may produce false positive or false negative results;" was contained in Farwell Brain Fingerprinting 3.0 and 4.0 and many other public domain sources, as discussed above. Everything in the BWS software that eliminated noise was copied directly from Farwell Brain Fingerprinting 3.0 and 4.0, both of which also contained additional, more advanced methods for eliminating noise than those that Dr. Maison ported to the BWS software.

e. "detects and disregards any attempted countermeasures by suspects or others involved in conducting testing;" Everything that the Dr. Maison BWS Software (BWS TFS) does to counteract countermeasures is derived directly from Farwell Brain Fingerprinting 4.0. BWS added absolutely nothing to the software relevant to countermeasures (BWS TFS). The methods that make Farwell Brain Fingerprinting 4.0 highly resistant to countermeasures are discussed in detail in Farwell 2012, Farwell et al. 2013, Farwell et al. 2014, and Farwell and Richardson 2022 (Farwell Dropbox).

f. "performs appropriate analysis of P300 measured responses utilizing statistical and machine learning algorithms and Artificial Intelligence;" The data analysis in Dr. Maison's BWS Software was copied directly from Farwell Brain Fingerprinting 3.0. This does involve statistical algorithms, which Dr. Farwell discusses extensively in his scientific publications, in particular Farwell 2012. It does not involve machine learning or artificial intelligence. There is no machine learning or artificial intelligence in Dr. Maison BWS Software or any software that Dr. Maison or Dr. Farwell obtained from BWS. Dr. Farwell has conducted research in machine learning and artificial intelligence; however, none of it is included in the Farwell Brain Fingerprinting software or the BWS programs, which were developed by porting the Farwell Brain Fingerprinting software. The BWS software that Dr. Maison downloaded contained absolutely no developments by BWS of machine learning or artificial intelligence. The reference to machine learning and artificial intelligence is simply a fabrication by Ika.

g. "generates unbiased reports for use by examiners, investigating agencies and legal authorities." This is contained in Farwell Brain Fingerprinting 3.0 and 4.0. It is simply a matter of printing out the same output that is displayed on the Brainwave Analysis User Interface, in both Farwell Brain Fingerprinting 3.0/4.0 and the BWS Software. This is open source and in the public domain.

126. In summary, all of the claims regarding software development by BWS in Ika's affidavit (Ika Affidavit, EFT 20-2, p. 4, par. 10 – 11) are totally, unequivocally, and demonstrably false. Brainwave Science did not develop any of the features, functions, methods, or capabilities that Ika describes (BWS TFS). All of these were simply copied from open-source and public-domain sources, including Farwell Brain Fingerprinting 3.0 and 4.0, the Brain Fingerprinting Specifications, and Dr. Farwell's patents and publications (Farwell Dropbox).

127. Ika's statement "Brainwave has expended substantial time and resources to address the afore-referenced challenges by developing proprietary software code, user interfaces, algorithms and hardware ('Brainwave Trade Secrets')" is totally false in every respect. Brainwave Science did not develop any of the specific items that Ika claims. All of the "above-referenced challenges" were effectively "address[ed]" by Dr. Farwell and others before Brainwave Science existed. In any case, whether these challenges were fully addressed before Brainwave Science existed,

Brainwave Science did absolutely nothing to address them other than copy the pre-existing solutions provided to Dr. Maison by Dr. Farwell.

a. The only thing that Brainwave Science developed that might be considered proprietary is the software code for communicating with the headset that Brainwave uses, a standard headset manufactured in Taiwan. Dr. Maison deleted this section of the code and did not use it in the development of Dr. Larry Farwell's Application, Farwell Brain Fingerprinting 5.0, the code he developed for and conveyed to Dr. Farwell.

128. If there are any "Trade Secrets" in the "software code, user interfaces, algorithms" (Ika Affidavit, EFT 20-2, p. 4, par. 10 – 11) – or any of the computations, measurements, methods, statistics, mathematics, know-how, features, results, or data in the BWS Software – then these are Trade Secrets of Dr. Farwell embodied in Farwell Brain Fingerprinting 3.0 and 4.0 and his documents constituting the specifications for the same (Farwell Dropbox, BWS TFS, Dr. Maison TFS).

129. The following statements in Plaintiff's Statement of Undisputed Material Facts (EFS #106-1) are demonstrably false, or at least disputed.

130. BWS Statement #5 is false, or at least is disputed. "Brainwave has developed a technology to assist authorities in conducting humane questioning of subjects and exonerating wrongfully accused or convicted persons. The technology, iCognative®, involves measuring 'P300' brainwave responses to confirm that certain information is or is not present within a person's brain. (Complaint ¶10, Answer ¶10)."

131. Brainwave did not develop said technology. Everything of substance in the Dr. Maison BWS Software was simply copied and translated from Dr. Farwell's Farwell Brain Fingerprinting 3.0 and 4.0. All of this was in the public domain. This is thoroughly documented in this document and in EFS #24 and Dr. Maison Affidavit (EFS #89).

132. BWS Statement #6 is false, or at least is disputed, except for the first sentence. "6. The underlying technology utilizing P300 'brainwaves' is not proprietary to Brainwave. (Complaint ¶11, Answer ¶11). However, the proprietary system developed by Brainwave has successfully addressed a number of problems which had previously prevented the effective use of P300-related technology by field agents. For instance, the code/algorithms developed by Brainwave's technology team, led by Maison, eliminated 'noise' which could provide false positive or negative responses. (Complaint ¶14, Answer ¶14)."

133. "The proprietary system developed by Brainwave addressed a number of problems…" Every method, algorithm, and technique contained in the code Dr. Maison developed for BWS was ported directly from Dr. Farwell's pre-existing Farwell Brain Fingerprinting 3.0 and 4.0. This has been thoroughly discussed in this document (Dr. Farwell 12/27/2022 Affidavit) and Dr. Farwell Affidavit (EFS #24) and Dr. Maison Affidavit (EFS #89). An examination of the evidence now before this Court – in BWS TFS and Dr. Maison TFS now being subjected to software comparisons by Mindfire – will show that all of the code/algorithms for eliminating "noise" were copied directly from code provided to Dr. Maison by Dr. Farwell. In fact, the only algorithm for eliminating "noise" that is not common to several thousand other programs is the optimal digital filters that were first published in the field of event-related brain potential research by Dr. Farwell (Farwell et al. 1993) and were translated line-for-line by Dr. Maison from Dr. Farwell's code to BWS code. Moreover, the statement that "problems" had "previously prevented the effective use of P300-related technology by field agents" is patently false. Dr. Farwell and his colleagues, including other field agents with intelligence and counterterrorism agencies such as the FBI and

the CIA, have been successfully using the Farwell Brain Fingerprinting P300-related technology in the field for over 20 years.

134. BWS statement #9 is true but misleading. "The source code developed by Maison for Brainwave consisted of approximately 1,000,000 lines of code (Tomkins Affirmation, Exhibit A, 51:3-51:12)."

135. Said source code did consist of approximately 1,000,000 lines of code. However, the code that BWS submitted to Codequiry was not all of the developed code. BWS left out of the comparison the code where Dr. Larry Farwell's Application was totally different from BWS Software (both the original Dr. Maison BWS Software and the Fraudulently Modified BWS Software) because it communicated with a different headset. This resulted in a falsely exaggerated finding by Codequiry regarding the similarity of the two software programs.

136. BWS statement #11 is incomplete and therefore disputed. "Maison's job at Brainwave wasn't necessarily to create every piece of code needed for Brainwave's system but to locate appropriate pieces of code and 'stitch' them together. (Tomkins Affirmation, Exhibit A, 37:13-38:9). Stitching together code is referred to as 'integration' of software code (Tomkins Affirmation, Exhibit A, 54:17-54:22)."

137. The integration or stitching together of open-source code undertaken by Dr. Maison involved implementing open-source software integration specifications provided by Dr. Farwell to Dr. Maison in the form of the integrated Farwell Brain Fingerprinting 4.0 and 3.0 and also the Brain Fingerprinting Specifications that Dr. Farwell provided to Dr. Maison (Dr. Farwell Dropbox). Mindfire's court-ordered software comparison according to the Statement of Work will necessarily involve accessing Dr. Maison TFS, Dr. Farwell Dropbox, and BWS TFS and noting what software programs reside there. This will definitively show that that he know-how for the software integration was open-source and provided by Dr. Farwell to Dr. Maison, and that it did not originate at BWS and was not developed by BWS.

138. BWS statement #12 admits that "Approximately ninety percent of the time spent by Maison in the development of Brainwave's code consisted of testing of the integrated code. (Tomkins Affirmation, Exhibit A, 53:6-53:21)."

139. 90% of the development time spent in testing is typical when code is being translated or ported from an existing application, as was the case here, where Dr. Maison was porting the pre-existing code of Farwell Brain Fingerprinting 3.0 and 4.0 to a new platform and language to produce Dr. Maison BWS Software. When developing new software, the time spent in testing ranges from 10% to 35% of the total time (https://devm.io/testing/time-estimation-for-software-testing-128078).

140. BWS statement #19 is not entirely false; however, it is misleading and is disputed. "The improvements, assistance, modifications and assistance provided by Maison in 2019 were incorporated in the copy of the 'Farwell Brain Fingerprinting Program' provided by Farwell to the University at Canterbury in Christchurch, New Zealand for their continued use in late 2019 (Tomkins Affirmation, Exhibit B, 59:25-60:6)."

141. Dr. Maison ported Dr. Farwell's Farwell Brain Fingerprinting 4.0 to a new platform and translated it into a new language to produce Farwell Brain Fingerprinting 5.0, the Dr. Maison BWS Software. All of algorithms, methods, statistics, mathematics, know-how, features, computations, results, data, measurement, and analysis in the Dr. Maison BWS Software -- and even the entire content and layout of the user interfaces for both of the functions of the software, Brainwave

Measurement User Interface and Brainwave Analysis User Interface –all of this was in the public domain and was provided by Dr. Farwell to Dr. Maison in the form of Farwell Brain Fingerprinting 3.0 and 4.0, the Brain Fingerprinting Specifications, and Dr. Farwell's publications and the now expired patents on his inventions (Farwell Dropbox, BWS TFS, Dr. Maison TFS).[13] In summary, everything that Dr. Maison provided Dr. Farwell with assistance on was in the public domain, and was provided to Dr. Maison by Dr. Farwell, not developed at BWS. All of this is definitively proven by evidence now before this Court in Dr. Farwell's 12/27/2022 Affidavit, Dr. Farwell's Dropbox, Dr. Maison TFS, and BWS TFS.

142. For the same reasons specified immediately above, BWS statement #23 is misleading and is disputed. "The modifications provided by Maison in 2019 were also incorporated in the copy of the 'Farwell Brain Fingerprinting Program' provided by Farwell to the Forensic Science Laboratory in Delhi, India. (Tomkins Affirmation, Exhibit B, 116:5-116:13)."

[13] The only part of the Dr. Maison BWS Software that was not in the public domain was the section that communicates with the BWS headset. Farwell Brain Fingerprinting 5.0 (and all other Dr. Farwell's versions) uses a different headset, and does not include that code.

Exhibit EAB

Comparison of Farwell Brain Fingerprinting 3.0 (1993) and 4.0 (2007)

Vs.

iCognative Software of Brainwave Science, Inc. (2019)

Dr. Lawrence A. Farwell

December 31, 2022

Table of Contents

What Is a Meaningful Comparison Regarding Trade Secrets?

What comprises a meaningful comparison of items with respect to trade secrets? If Chevrolet accuses Ford of stealing its trade secrets, it's not useful or informative to simply compare all features of the respective cars. Both have steering wheels, four wheels, an engine block, spark plugs, tail lights, a drive chain, a transmission, and thousands of other identical or comparable components. If there has been no misappropriation of trade secrets or violation of intellectual property, both cars will nonetheless be about 99.9% the same as each other, feature or feature, structure for structure, and function for function.

The same applies to software. Before comparing software to determine if one set of code contains trade secrets belonging to another set of code, first one must determine what in both is open source or in the public domain.

The US District Court for the Eastern District ordered as follows:

> 4. *Defendants must provide to plaintiff, at plaintiff's sole expense, a report from an independent third party confirming that any P300-related software demonstration, sale, update, or transfer by defendants does not include plaintiff's "confidential or proprietary information."*
>
> *For the purposes of this preliminary injunction, "confidential or proprietary information" is defined as any portion of the program plaintiff originally submitted to Codequiry as its code.*

Obviously, "any portion of the program originally submitted" is to be taken in the context in which the judge ordered it and in consideration of the intent of the judge.

The claim of BWS LLC/Inc., as set forth in the BWS v Arshee et al. lawsuit, is that after BWS LLC was founded and began software development in 2013, BWS added to the existing state of the art and the existing public-domain methods and developed improvements on existing technology that constituted trade secrets, which it implemented in 2019. For example, the Complaint specifies that BWS developed new methods for eliminating "noise" in the data and implemented them in 2019, and that Arshee, Farwell, and Maison later used these novel methods in their software.

Just as all cars have steering wheels, all brainwave applications measure brainwaves. All P300-based programs for detection of concealed information have some features that are just as common, just as universal, and just as much in the public domain as steering wheels on a car.

Consider the situation if Chevrolet says that Ford incorporated their trade secrets in a car, and a judge orders Ford to engage an independent company to examine the two software programs and provide a report to Ford, which Ford is instructed to forward to Chevrolet and Chevrolet is instructed to pay for, as analogous to the present case. Clearly, the judge would not intend that any competent testing company would take a look at both cars, see that both had steering wheels, and report that Ford had stolen trade secrets from Chevrolet. Any competent testing company would examine both cars in light of the known facts of the field, and what features of a car are in the public domain. A report lacking this information would be incompetent and worse than useless. Yes, both cars have steering wheels. This says nothing about what the judge ordered the parties to determine. The judge, lacking specific knowledge of all the details of automobiles that any competent testing company would have, might specify as an example "any part of the 2022

Chevrolet Camaro" that Chevrolet claimed Ford copied in making their 2013 Mustang. In light of the reality of the situation and the facts that are known to any competent testing company, this requirement must take into consideration what anyone with common sense would realize: that any meaningful comparison must specifically identify which of the common features of the two cars are in the public domain, and which are not.

A testing company need not engage in the legal interpretation of "trade secrets." It only is required to say "Here's what is in each car that is in the public domain, here's what is each car that is not in the public domain, and here is what in in both cars and is not in the public domain."

It is also necessary, of course, to note in the report that Ford's 2013 Mustang existed before Chevrolet's 2022 Camaro, so it is logically impossible for Ford's car to have incorporated "any part of the 2022 Camaro" in its design.

In the present case, we must assume a certain level of competence, common sense, and reasonableness on the part of the judge. Again, just as all cars have steering wheels, all brainwave applications measure brainwaves. All P300-based programs for detection of concealed information have some features that are just as common, just as universal, and just as much in the public domain as steering wheels on a car. These features are described below with reference to both programs.

A report that ignores or denies the obvious reality of the situation would not be a valid report, nor would it respond to the clear intent of the Court. A report that excluded the established, known facts regarding what is in the common domain would result in a failure of the test by (1) all software for detection of concealed information using brainwaves, beginning with Dr. Farwell's invention of Brain Fingerprinting and initial program in 1985; (2) all software programs developed over the last century that measure brainwaves; (3) all programs that are implemented using any of the seven open-source software tools that Dr. Maison used to develop the iCognative 2019 program. Any of the above would of necessity fail the test of not containing "any part of" the 2019 iCognative 2019 program, if that phrase were interpreted without reference to the actual reality of the situation; that is, if that phrase were interpreted so as to deny or ignore the existence of open-source and public domain scientific protocols, algorithms, mathematical and statistical techniques, and software tools.

Clearly, the judge did not intend that any program that measures brainwaves, applies the standard experimental protocols in the field (as published in the scientific journals), measures P300 brain responses, applies the standard statistics in the field, or contains the many other public-domain features that all such programs contain, would be considered as "confidential proprietary information." If applied universally, such an interpretation, aside from being contrary to reason, common sense, and the clear intent of the judge, would prevent all brainwave research now going on around the world, and in particular prevent all past, present, and future systems for the detection of concealed information, including systems that existed before the iCognative 2019 software existed and even before Brainwave Science LLC or Brainwave Science, Inc. existed. Obviously, in the world of reality, at least the pre-existing programs could not possibly contain trade secrets developed by BWS LLC/Inc. in 2019. Qualified experts in the field, and in fact anyone with normal commons sense (which we must assume the judge has), must also know that not all such programs in the present and the future contain BWS' proprietary information.

In other words, the Court's order can only reasonably and validly be interpreted in light of the reality of the situation at hand, a major feature of which is the existence of open-source and public-domain software, protocols, and algorithms.

The issues at hand for a testing company are as follows:

1. With respect to the scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed:
    a. What in the BWS software is in the public domain.
    b. What in the Farwell software is in the public domain.
    c. What is in both the BWS and Farwell software programs that is in the public domain.
    d. What, if anything, is in both the BWS and Farwell software programs that is not in the public domain.
2. With respect to the specific software applied to implement the above:
    a. What in the BWS software is in the public domain.
    b. What in the Farwell software is in the public domain.
    c. What is in both the BWS and Farwell software programs that is in the public domain.
    d. What, if anything, is in both the BWS and Farwell software programs that is not in the public domain.
3. If the analysis concludes that the facts outlined below are accurate, then a correct analysis will conclude that the BWS software does not have any features that are included in the Farwell software that are not also in the public domain, except for the specific protocols for communicating with the headset and digital signal processors, since these hardware features are totally different and incompatible for the respective programs.
4. If the analysis reveals the fact that the Farwell programs were implemented using entirely different software tools and in an entirely different environment and operating system, as specified below, a specific line-by-line, phrase-by-phrase comparison will conclude that the Farwell programs do not include "any part of the BWS code submitted to Codequiry."
5. If the analysis reveals the fact that the Farwell 1993 and 2007 programs existed before the BWS 2019 program existed (and even before BWS existed), the report must conclude that it is logically impossible for the Farwell program to contain "any part of the BWS [2019] code submitted to Codequiry" and therefore it does not.

The Present Comparison and the Structure of This Document

The below is an analysis of the features of:

A. (1) the Farwell Brain Fingerprinting 4.0 Brainwave Analysis Program (developed in 2007 in the IDL platform); (2) the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program (2007) and (3) the Farwell Brain Fingerprinting 3.0 Brainwave Analysis Program (1993); and

B. (1) the iCognative 2019 program,

with respect to scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed.

Following that analysis of methods is an analysis of the public-domain software tools applied to implement those methods in the respective programs.

This document is organized as follows. First, the background and history are briefly summarized. Then the functions of the iCognative 2019 program are considered sequentially in the order in which the program is normally run. The previous, public-domain sources of these in the Farwell programs and elsewhere, if any, are identified. Then the public-domain software tools used to implement the above are discussed. Finally, a References section lists the scientific papers, patents, and other references containing the open-source and public-domain information.

For the one section of the iCognative software where there is no previous public-domain source, namely the communication with the headset and the digital signal processors embedded therein, that is also noted in the context in which this arises in the application of the program.

The Farwell Brain Fingerprinting program, in all its various versions and imitations including the iCognative 2019 program, has two main modules: data acquisition and data analysis. These two will be considered in two separate sections below. An additional section of this document will delineate the open-source and public-domain software tools used in the iCognative software to implement all of the above.

The Farwell Brain Fingerprinting program, in all its various versions and imitations including the iCognative 2019 program, uses two screens on two separate monitors. The scientist's screen contains the user interface and provides graphical and text displays of information regarding the real-time data while being collected in the data-acquisition phase, and the data and analysis results in the data-analysis phase. The subject screen displays the stimuli to the subject. The stimuli comprise words or pictures that elicit the subject's brainwave and manual responses.

Background and History

The background is as follows. Dr. Larry Farwell wrote the original Farwell Brain Fingerprinting brainwave measurement program in the early 1980s in Fortran and assembly code on a customized DEC PDP 11 running RT11 operating system. He wrote the Farwell Brain Fingerprinting brainwave analysis program in Fortran on a Harris 800 running VOS operating system.

Dr. Farwell and colleagues published the algorithms and scientific protocols in the scientific literature (Farwell and Donchin 1986, 1988a, 1991; Farwell and Smith 2001; Farwell 2012; Farwell et al. 2013), as did others, including William Iacono (Allen and Iacono 1997). Dr. Farwell also disclosed the same in an invited article on Brain Fingerprinting in the Encyclopedia of Forensic Sciences (Farwell, 2014).

In the early 1990s Dr. Farwell, Brian Foote, and Himansu Desai wrote a new version of both the data acquisition and data analysis modules on a PC running DOS. The MetaWINDOW software package was used to generate a graphical user interface in the DOS environment. Dr. Farwell and Himansu Desai developed a Windows version shortly thereafter.

Dr. Farwell and colleagues disclosed the digital filters used in the program in the scientific literature in Farwell et al. (1993). The program for designing the optimal, equal-ripple, linear phase, low-pass, finite-impulse-response (FIR) filters (PMFLTR.FOR) was written in Fortran by James H. McClellan at MIT, Thomas Parks at Rice University, and Lawrence Rabiner at Bell Laboratories, modified by Eric Romesburg of HAL Communications Corp., and further modified by Dr. Farwell in 1991.

The Fortran program to apply the filters (FILTER.FOR) was written by Dr. Farwell and Phil Goddard in the DOS environment in 1990.

The Farwell Brain Fingerprinting 4.0 Brainwave Analysis Program was developed according to Dr. Farwell's detailed specifications implementing all of the above. The developers were William T. Johnson, PhD, Pete Martone, and Brian Foote in 2004 - 2006. Dick Jackson later made some minor modifications in 2013.

Dr. Farwell was a consultant to the CIA in 1992 – 1993 on a project to port the Farwell Brain Fingerprinting Brainwave Measurement and Brainwave Analysis programs to a new, Unix-based platform that was undertaken by Westinghouse under Dr. Farwell's supervision. The specifications provided by Dr. Farwell for the CIA/Westinghouse system were the same as those he provided for the two Farwell Brain Fingerprinting 4.0 (2007) programs. Dr. Farwell also provided the same specifications to BWS LLC, and Dr. Maison wrote the BWS' iCognative software to port Dr. Farwell's system to a different platform, using different open-source software tools to do so.

Everything in all of the above Dr. Farwell programs is in the public domain. Dr. Farwell published the algorithms and scientific protocols in the scientific literature, and shared his algorithms, protocols, methods, and source code with other scientists including FBI scientists Drew Richardson, Sharon Smith and the FBI Laboratory; William Iacono of the University of Minnesota and his colleagues; US Navy scientist Rene Hernandez, the US Navy, and Uniformed Services University of the Health Sciences (USUHS); Theodore Bashore, Paul Rapp, and the University of Pennsylvania; Westinghouse Electric Corporation; and the CIA. The relevant scientific publications are listed in the Reference section below.

All of the above is also in the public domain due to having been disclosed in patents that have now expired. In order to obtain a patent, the inventor must disclose the method such that one skilled in the art is enabled to practice the invention, in this case the P300-based method for detection of concealed information ("Farwell Brain Fingerprinting") that was invented by Dr. Farwell and implemented in the two Farwell Brain Fingerprinting 4.0 / 2007 programs (and many others).

All of the above is in the public domain, as it was disclosed and fully enabled in the following US patents, which have now expired: #4,941,477, #5,363,858, #5,406,956, and #5,467,777. Dr. Lawrence Farwell is the inventor on all of these patents. Ownership of the first of these, #4,941,477, which Dr. Farwell obtained while still a graduate student at the University of Illinois, has never been disputed. Ownership of the other three has been disputed in various

lawsuits. However, none of the disputes regarding ownership of expired patents changes the fact that everything disclosed in the patents is now in the public domain as a result of the patents having expired.

The two primary programs to be compared with iCognative in the present instance are the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program (2007) and the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program. In addition, the analysis.exe program (for which we have only the executable), written by Brian Foote, Dr. Farwell, and Himansu Desai in 1992, implemented the same algorithms, mathematics, and statistics as the 2007 program, and even included highly similar displays of the data and results.

In 2013 – 2016, Dr. Farwell provided Brainwave Science, LLC (BWS LLC, whose assets but not ownership were later passed to Brainwave Science, Inc., BWS Inc.) with all of the above public-domain scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed in 2013 – 2016. Dr. Maison wrote the iCognative 2019 program to implement these same public-domain scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed. He used different public-domain and open-source software packages to implement all of the above than those used by Dr. Farwell and others previously.

The detailed specifications provided by Dr. Farwell that were implemented by Dr. Maison and others and became the iCognative software were the same as the specifications that Dr. Farwell provided to his own software engineers who developed the Farwell Brain Fingerprinting 3.0 and 4.0 programs, to Westinghouse to develop the CIA/Westinghouse system, and to colleagues such as Dr. William Iacono who replicated Dr. Farwell's research in the scientific laboratory.

The following is the sole exception to the above. The BWS iCognative 2019 program uses a different headset, with different embedded digital signal processors and amplifiers, than previous programs. Therefore, the software for controlling and communicating with the headset, digital signal processors, and amplifiers is totally different from that of previous programs, including the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program to be compared here with the iCognative software.

Sections and Features of the iCognative 2019 program and Their Public Domain / Open Source Origins

The home screen of the iCognative 2019 program is the Case Manager. It allows the user to enter a new case, import or export a case, or open a case. These are all standard, public-domain procedures common not only in brainwave research but in all kinds of research and non-research applications. None of these functions have anything to do with the science and technology of Farwell Brain Fingerprinting, and none constitute trade secrets. (The look and feel of the page is determined by the open-source software tools used to implement it, as discussed elsewhere.)

Selecting a case takes the user to the "Case" tab. This displays, and allows for entering and editing, the name and number of the case, notes, summary, and associated documents. All of this is simple, public domain information and functions, common to many scientific and non-scientific applications.

The next tab is the "Subject" tab. It contains the subject's name and subject number and some basic, non-scientific information. All of this is simple, public domain information and functions, common to many scientific and non-scientific applications.

The next tab is the "Facts" tab. The "Facts" here refer to the stimuli that will be displayed on a computer monitor to the subject to elicit the brainwave responses. Here the user can enter or edit the stimuli of the three types used in Farwell Brain Fingerprinting: targets, probes, and irrelevants. For text stimuli, these are the words that will be displayed to the subject to elicit the brainwave responses. For picture stimuli, these identify the files where the pictures that will be displayed.

The information on the "Facts" page, and the ability to enter and edit it, is the same as in all Farwell Brain Fingerprinting programs previously developed by Dr. Farwell and others. The look and feel of the page is somewhat different from the look and feel of the same in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement program, due to the fact that the respective programs used different open-source software packages and tools to input and edit the same data.

The terms "target," "probe," and "irrelevant" used in the iCognative system, and the specific types of stimuli to which they refer, date back to the original Farwell Brain Fingerprinting program that Dr. Farwell wrote in the 1980s, and have been included in every version since, including the Farwell Brain Fingerprinting Brainwave Measurement system (2007) and the Farwell Brain Fingerprinting 4.0 Brainwave Analysis program.

The next tab in the iCognative 2019 program is the "Protocol" tab. This allows the user to organize the stimuli – targets, probes, and irrelevants – into groups and sets. A group comprises one probe, one target, and four irrelevants. A set comprises several groups, usually 3 groups. This same exact function is provided by the Farwell Brain Fingerprinting 4.0 program by placing each stimulus group on a separate page, and combining several groups across several respective pages to create each stimulus set. Stimulus sets are written to disk in the Farwell Brain Fingerprinting 4.0 program, and recalled when needed by accessing the appropriate file.

These same things are stored in memory in the iCognative 2019 program, with the same content, meaning, and nomenclature as Dr. Farwell's previous programs. The look and feel is somewhat different for the identical function in the iCognative 2019 program, where the groups comprising a set are seen on the same page, along with other sets. Everything of substance on the "Protocol" tab is contained in the Farwell Brain Fingerprinting 4.0 program. Dr. Farwell provided BWS LLC with the exact same specifications for this facility as he had applied in his own previous program, and the Dr. Maison wrote the software accordingly.

The next tab is the "test setup" tab. Here the user enters the subject name and protocol to be used when this subject undergoes the brainwave test. This tab implements the same functionality that the Farwell Brain Fingerprinting 4.0 program accomplishes by entering the subject number and reading the protocol (that is, the stimuli to be used with this subject) from disk. Here again, the same data, the same functions, and the same nomenclature were implemented in the iCognative 2019 program as in the previous Farwell Brain Fingerprinting 4.0 program. Dr. Farwell provided all of these to BWS LLC and designed the specifications for implementing the same.

The next tab is the "Conduct Test" tab. Here the user selects the subject to be tested ("subject name"/ "subject number") and the stimuli and parameters to be used in the testing (the "setup"), and the specific sets of stimuli to be presented in each test.

Next, the subject instructions are read to the subject, and the experimenter interacts verbally with the subject to make sure that they understand the instructions. In the Farwell Brain Fingerprinting 4.0 system, these instructions were provided in document files and/or paper documents. In the iCognative software, the same instructions are presented on a computer screen under control of the software. Dr. Farwell wrote the subject instructions in the iCognative software word for word. These are the same as the instructions provided when the Farwell Brain Fingerprinting 4.0 program was applied, and essentially the same as in all the previous programs, as disclosed in Dr. Farwell's patents and scientific publications cited below.

After the instructions are read, the actual brainwave testing begins. Everything described below that is contained in the iCognative 2019 program is also contained in the Farwell Brain Fingerprinting 4.0 program. The Farwell Brain Fingerprinting 4.0 program also contains a few features that were not ported to the iCognative version.

The program presents a series of stimuli consisting of words or pictures on a separate screen viewed by the subject. The program records the subject's brainwave response to each stimulus. The program also records a button press response from the subject for each stimulus. Each presentation of one stimulus and the corresponding brain response and button-press response is referred to as a "trial." A stimulus is presented every 3 seconds (default timing).

The algorithm for presenting the stimuli and recording the subject's brain and manual responses is as follows. Three types of stimuli are presented: Targets, Probes, and Irrelevants. In an entire session, there are usually 3 stimulus sets, each consisting of 3 targets, 3 probes, and 12 irrelevants. One of the three sets is presented in each test. Generally at least 9 tests are run in a session, and the results are computed on the combined data.

The user selects the stimulus set to be presented in this test. The default number of Targets is 3, Probes 3, and Irrelevants 12, for a total of 18 unique stimuli to be presented in this test (also known as a "block.")

First, the parameters and variables must be declared and initialized. The primary variables comprise the following. These will initially be named, and will be explained further below in the sequence in which they are used.

All of the below A - O are contained in both the Farwell Brain Fingerprinting 4.0 program and the iCognative 2019 program.

A. Arrays for the ongoing EEG data in each channel, the EEG data for each trial, and the average event-related brain potential (ERP) response to each of the three stimulus types (Target, Probe, Irrelevant) at the primary EEG channel (default: Pz scalp location).

B. The count of the number of trials presented – Targets, Probes, Irrelevants, and Total;

C. The count of the number of "good" (artifact-free brain response) trials Targets, Probes, Irrelevants, and Total;

D. The count of the number of button-press responses of each type.

E. The reaction time (time from stimulus onset until the button press response) for each trial.

F. The average reaction time (to be updated each trial).

G. The inter-stimulus interval (time from the onset of one stimulus until the onset of the next stimulus; default = 3 seconds).

H. The duration of the pre-stimulus baseline.

I. The duration of the pre-stimulus fixation point / warning stimulus (length of time an "x" is presented on the screen before each stimulus is presented, to let the subject know a stimulus is about to be presented and provide a focus point where they will see it).

J. The stimulus duration (length of time the stimulus is presented on the screen).

K. The artifact-detection epoch, the length of time that the artifact-detection algorithms are to be applied on each trial, and the beginning and ending time for applying the artifact-detection algorithms (default = 0 - 1800 msec post-stimulus onset).

L. The number of "good" (artifact-free) trials required for the test to be complete, after which the program stops presenting stimuli, by trial type. Default is 12 targets, 12 probes, and 36 irrelevants. (These can be set by the user in an optional "Parameters" dialog box.)

M. The maximum range of EEG voltage allowed for a trial to be considered "good" (artifact-free). Default = 200 microvolts. (These can be set by the user in an optional "Parameters" dialog box.)

N. The digitizing rate of the digital signal processor.

O. Several other technical parameters.

All of the below 1 – 29 are contained in both the Farwell Brain Fingerprinting 4.0 program and the iCognative 2019 program, except for a few advanced features that are only contained in the Farwell Brain Fingerprinting 4.0 program; each of these is noted below.

When the user starts the test, the program proceeds to present the stimuli on the subject's screen and to record the brainwaves and other results and display them on the scientist's screen. This comprises the following.

1. Randomize all of the stimuli, without reference to stimulus type (Target, Probe, Irrelevant). Default number of unique Probes in a set = 3; default number of unique Targets = 3; default number of unique Irrelevants = 12; for a total of 18 unique stimuli in the set being presented in this test.

2. Begin recording ongoing EEG data for each channel. (For iCognative, there are two channels, one for EEG at the Pz (parietal midline) scalp location, and one for eye movements (EOG, measured from the forehead). (The Farwell Brain Fingerprinting 4.0 program records 3 EEG channels, Fz, Cz, and Pz, plus the eye channel.)

3. Display the ongoing EEG and EOG data in an ongoing moving display on the scientist's screen. This will continue throughout the test, regardless of what stimuli are being presented and what Trials are being extracted from the ongoing EEG data.)

4. Turn on a timer to mark the beginning of a Trial.

5. Present a fixation point / warning stimulus consisting of an "X" (or a small square when the stimuli are pictures) for a number of milliseconds (default = 1000), then turn it off.

6. Immediately upon turning off the fixation point, present the stimulus for a number of milliseconds (default = 400), then turn it off. Keep track of which stimulus was presented, and what type it was (Target, Probe, or Irrelevant).
7. Wait until the end of the inter-stimulus interval (default = 3000 msec). This is the end of the trial.
8. Place the EEG and EOG data for each channel in a single-trial array. [1] (For iCognative, there is one EEG channel and one EOG/electro-oculograph/eye channel. For the Farwell Brain Fingerprinting 4.0 program, there are 3 EEG and one EOG channels.)
9. Apply the artifact-detection algorithm(s) to determine if this is a "good" (artifact-free) trial. For iCognative, there is only one algorithm, applied to two channels. If the total range in microvolts of the EEG data in the EEG channel exceeds a criterion (default = 200 microvolts), or the total range in microvolts of the EOG (eye) data in the EOG channel exceeds a criterion (default = 200 microvolts), the trial is "rejected," and not "good." Otherwise, the trial is "good."[2]
10. Update the count of total trials (includes all trials, "good" and "rejected") of this type (Target, Probe or Irrelevant) presented, and the total count of all trials of all types presented.
11. If the trial is "good," update the count of "good" trials of this type, and the total count of "good" trials of all types combined.
12. If the trial is "good," recompute the average ERP waveform response for this trial type (Target, Probe, Irrelevant), including this trial.

[1] Note: The following can be safely ignored, and is presented to explain some complications in iCognative the code that might otherwise be confusing. For iCognative, the data associated with each trial include not only the 3000 msec of data for this trial (which includes this Trial's 1000 msec pre-stimulus baseline), but also the 1000 msec pre-stimulus baseline – when the fixation point is being presented – for the next trial. This is for the purpose of digital filtering during the analysis phase of the test. A digital filter distorts the waveform at the beginning and end of the epoch filtered. Therefore, 1000 msec are included from before stimulus onset when the meaningful EEG data begin, and 1000 msec are included from after the trial is over, so that if the first and last second of data are distorted by a digital filter in the data analysis, all of the relevant data will be preserved undistorted.

[2] The EEG and EOG voltage range criterion is the only method applied in the iCognative software for reducing "noise" in the data during data acquisition. The Farwell Brain Fingerprinting applies this same algorithm for detecting artifacts, and also applies several more: mean absolute deviation (MAD), threshold, and slope. In addition the Farwell Brain Fingerprinting 4.0 applies optimal digital filters during data acquisition, which reduces noise in the ERP and EEG displays. iCognative does not apply these filters in data acquisition. Both iCognative and the Farwell Brain Fingerprinting IDL analysis programs apply these filters in data analysis. This will be further discussed in the section on data analysis.

13. While this trial is going on, poll the button-press manual response device[3] for button presses (reaction-time/RT responses), from stimulus onset until a time specified by a parameter that is the latest time for a legal button press (default = 1800 msec post-stimulus onset).

14. Classify the button presses as follows.[4] If neither button is pressed or both buttons are pressed, the response is illegal, and counts as an error. If one and only one button is pressed the response is legal (but not necessarily correct). Left button press is correct if the stimulus is a Target, and an error if the stimulus is an Irrelevant or a Probe. Right button press is correct if the stimulus is an Irrelevant or a Probe, and an error if the stimulus is a Target.

15. If the response is legal (whether it is correct or not) update the count of legal button presses for this trial type.

16. If the response is legal, recompute the average button press response time (RT) for this trial type. The average response time includes all legal responses, both correct and errors.

17. If the response is correct, update the total number of correct button presses.

18. Compute the percent of correct responses by dividing the number of correct button-press responses by the total number of Trials presented (not the number of legal button-press responses) and converting the fraction to a percentage.

19. Record the Trial and all associated stimulus, EEG, and button-press reaction time and accuracy data on disk, or place the same in memory to be written to disk later.

20. Display all of the above on the scientist's screen, as follows.

21. Continue to display the ongoing EEG and EOG for all channels. Display this at the upper left of the scientist's screen.

22. Display the average ERP responses for all three trial types (at the Pz channel). Target response curve is red, Probe response curve is blue, and Irrelevant response curve is green. (These are standard colors for Farwell Brain Fingerprinting programs, including the Farwell Brain Fingerprinting 4.0 program and also the iCognative software. The graphs are identical in the iCognative 2019 program and the Farwell Brain Fingerprinting 4.0 program.) Display this below the ongoing EEG, on the lower left of the screen.

23. Display the stimulus type for this trial (Target, Probe, Irrelevant), the actual stimulus (text displayed to the subject), and the reaction time. (iCognative displays these 3. The Farwell Brain Fingerprinting 4.0 program displays the same 3, plus two other parameters,

---

[3] iCognative uses a standard X-box controller as a response device held by the subject. The Farwell Brain Fingerprinting 4.0 program uses mouse buttons on a standard mouse, held by the subject.

[4] Note that the counts of button-press responses of various types (legal, correct, error) are totally independent of whether the brain responses are "good" or not. The counts used in the computations with respect to button press accuracy and reaction time are not the same as the counts used for computing the ERP averages.

the channel being displayed -- since there are 3 EEG channels and the user can choose -- and a scaling value for changing the size of the display, which is accomplished with values entered on the keyboard. The size of the iCognative display can also be changed, using sliders controlled with the mouse.) Display this on the upper right of the scientist's screen.

24. Display the counts of trial of the various types in a chart. Columns of the chart are trial types Target, Probe, Irrelevant, and Total. The first row is the Required number of trials (in the columns of each type, Target, Probe, Irrelevant and Total). The other rows have the same columns. The other rows in order are "good" trials, RT (button press reaction time), and Accuracy (button press percentage accuracy). These charts are identical in the iCognative 2019 program and the Farwell Brain Fingerprinting 4.0 program. Display this below the above chart, at the vertical middle of the right side of the screen.

25. Display the artifact detection data in a second chart below the trial count chart. The columns of the chart are the channels. The rows of the chart are the artifact detection methods. Each cell displays a number representing the value for this trial of the variable embodying the result of the artifact-detection algorithm. (For iCognative, there is only one artifact-detection algorithm, the maximum allowable "range" of voltage, and two channels, EOG and Pz. For the Farwell Brain Fingerprinting 4.0 program there are four channels and four artifact-detection algorithms.) Display this below the above chart, at the lower right screen.

26. If there is an artifact in any channel for any artifact-detection algorithm, turn the background color of that cell in the display chart to red until the end of the trial.

27. The entire display screen for the actual brainwave test for the iCognative software and the Farwell Brain Fingerprinting 4.0 software are virtually identical. Both comprise an ongoing EEG display by channel, an average ERP display of Target (red), Probe (blue), and Irrelevant (green) waveforms, a chart of the trial counts with rows and columns as described above, and a chart of artifact-detection results with rows and columns as described above. The EEG and ERP displays and the charts are identical, down to the color coding of the average displays for the waveforms and the positions of all of the waveform displays and charts.

    (The only differences between the iCognative 2019 program and the Farwell 2007 Brain Fingerprinting program are the number of channels and number of artifact-detection algorithms, and a few cosmetic differences such as the color of the background, fonts, etc.)

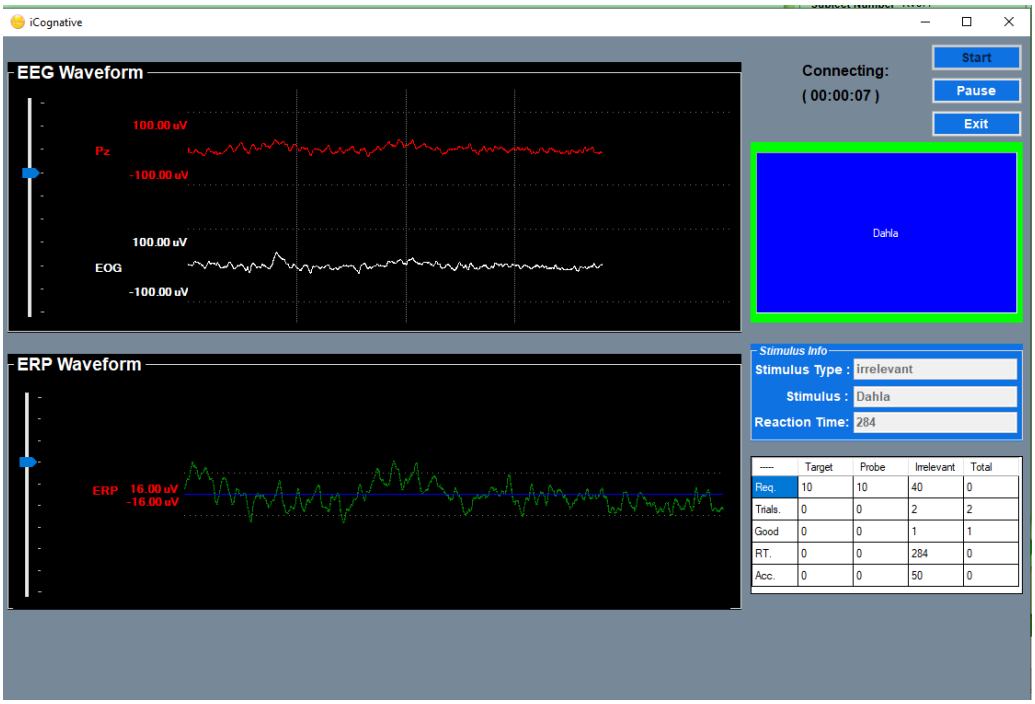
    BWS Inc. did not provide a screenshot of the scientist's screen for actual brainwave test (data acquisition or "capture") in their Complaint. They did provide a screenshot of the "Replay" screen accessed at the "Replay" tab. This is for use in demonstrations. Instead of collecting brainwave data and displaying them, the "Replay" option reads previously collected data from a data file, and displays the data in pseudo-real time, so that it provides the identical look and feel as the actual data acquisition program.

    There are a few minor differences between the "Replay" screen and the actual data acquisition screen in iCognative, as follows. Rather than the controls for an actual test, at the top right there are buttons to "Start," "Pause," and "Exit" the replay. Below that,

there is a duplicate of what the subject is viewing on the subject screen. The stimuli flash on this screen in the same timing as on the subject screen. (This repeat of the subject screen is not presented on the scientist's screen in the actual data-acquisition function.) Also, the artifact rejection screen at the lower right is not included, in order to make room for the repeat of the subject's screen above.

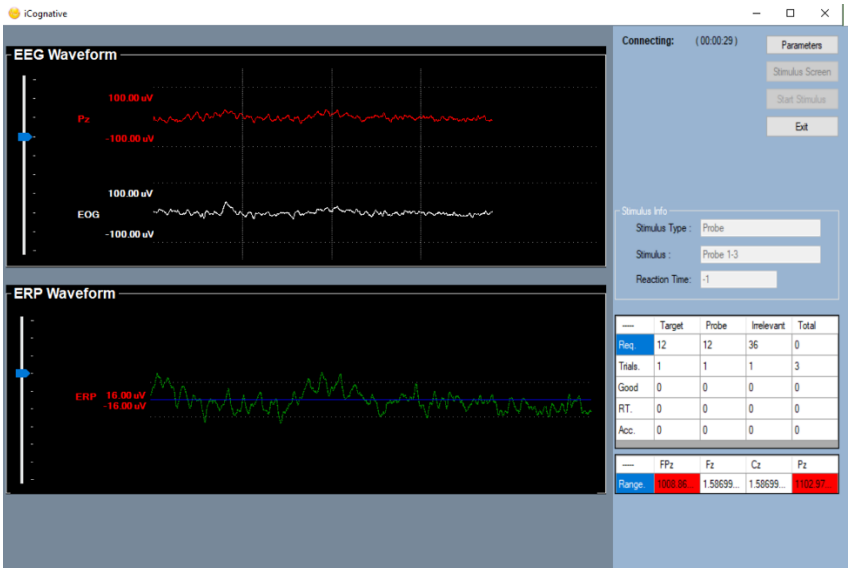
The two waveform displays; the chart with the Stimulus Type, Stimulus, and Reaction Time for the current single trial; and the chart with the trial counts, average reaction time, and accuracy are identical in the Replay screen and the scientist's screen for the actual brainwave test (labeled "capture").

As can be seen from the below pictures, the Replay screen is also identical to the Farwell Brain Fingerprinting 4.0 screen for the actual brainwave test, except for the differences noted above where the Replay screen was changed from the brainwave test ("capture") screen of iCognative.



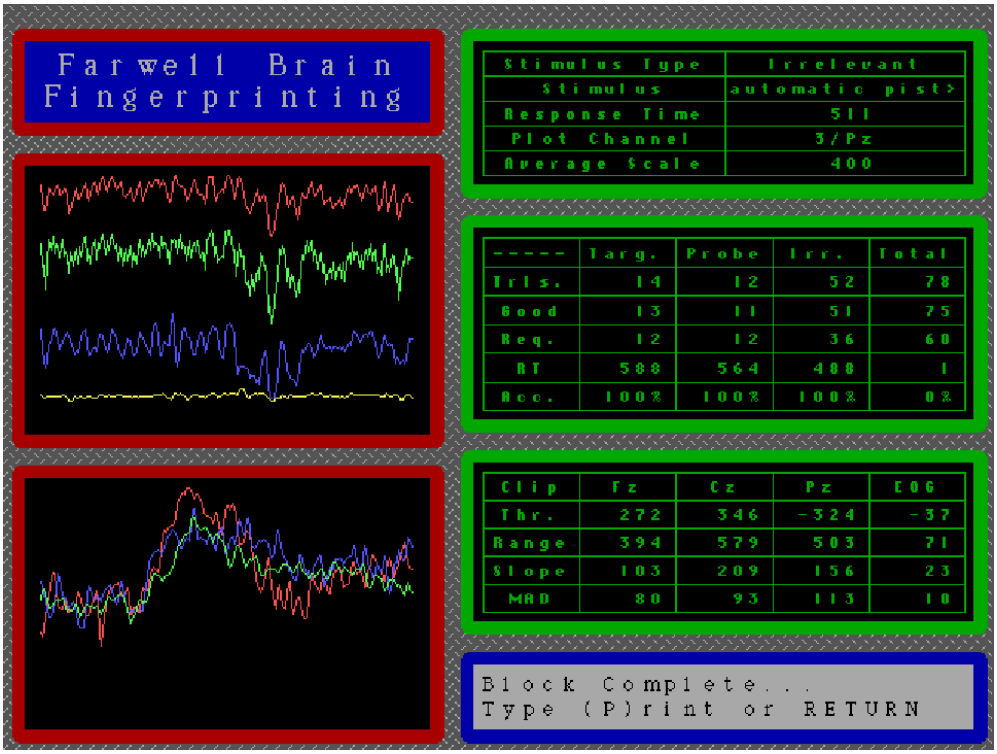
iCognative "Replay" screenshot from BWS Inc.'s Complaint in the lawsuit

This is approximately what the iCognative scientist's screen looks like during the actual brainwave test. (Note: This is a mock-up, for informational purposes and not to be taken as authoritative.)



Approximate mock-up of iCognative scientist's screen during an actual brainwave test.

Compare that with this screenshot of the scientist's screen of the Farwell Brain Fingerprinting HBRL data acquisition program during a test. Except for the additional channels and additional information on the Farwell 2007 screen, the two are virtually identical.



Farwell Brain Fingerprinting 4.0 screenshot during actual brainwave test

Compare the above with a photo of the screen for a previous version of the Farwell Brain Fingerprinting program implemented on the same platform as the 2007 version. In this photo, taken in 2002, Dr. Farwell is Terry Harrington, who was falsely convicted of murder and released after serving 23 years of a life sentence in prison when Dr. Farwell's Brain Fingerprinting test showed that the record stored in his brain did not match the crime, and did match his alibi. The Farwell Brain Fingerprinting test and Dr. Farwell's expert-witness testimony on it were ruled admissible as evidence in court.

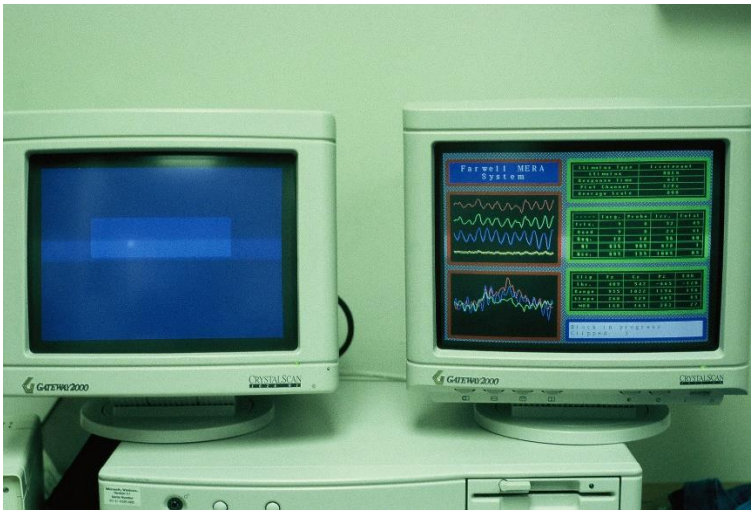
Farwell Brain Fingerprinting system in 2002, testing innocent convict Terry Harrington.

The above 2002 screen, like the Farwell 2007 version, contains everything that is on the iCognative screen during the test (and more).

Here is a photo of the Farwell Brain Fingerprinting system Dr. Farwell applied in testing serial killer JB Grinder in 1999. Grinder confessed and was sentenced to life in prison when the Farwell Brain Fingerprinting test showed that the record of the murder of Julie Helton was stored in his brain. Here again, the screens during the actual brainwave test are virtually identical to the Farwell 2007 and iCognative versions.

Farwell Brain Fingerprinting test on serial killer JB Grinder in 1999.

The following photo of the Farwell Brain Fingerprinting system was taken in 1993, when the PC-based version was new. This system was developed under a contract with the CIA and applied at the FBI and the US Navy.



Farwell Brain Fingerprinting system in 1993.

Here again, the Farwell Brain Fingerprinting system as early as 1993 contained everything contained in the iCognative system that was involved in the actual brainwave test. Dr. Farwell shared the 1993 version widely with colleagues as well as private companies and government agencies, and published the algorithms in scientific journals.

28. Except for the additional channels and additional information on the Farwell screens, the screens during the actual brainwave test with iCognative software are virtually identical to those of the public-domain Farwell Brain Fingerprinting 4.0 program, and even those of the Farwell Brain Fingerprinting 2002, 1999, and 1993 versions.

29. What is far more important than the appearance of the screens is that the data that are displayed on the respective screens, and the scientific protocols, methods, and algorithms that produced these data, are also equivalent between the Farwell Brain Fingerprinting 4.0 program and the iCognative 2019 program. Since the Farwell Brain Fingerprinting 4.0 program is entirely public domain, this means that the entire iCognative 2019 program is entirely public domain, for that part of the program that comprises the actual brainwave test.

30. When all of the stimuli have been presented, re-randomize the stimuli, and present them all again. Continue repeating this process until the required number of "good" Target, Probe, and Irrelevant trials have been presented and the corresponding data recorded.

There are two substantive parts of the iCognative 2019 program and the Farwell programs: The actual brainwave test, considered above, and the data analysis, considered below. The data analysis procedures, methods, and algorithms were developed according to a detailed software design provided by Dr. Farwell to BWS LLC. This contained a subset of the features in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program . Everything of substance in the data analysis of the iCognative 2019 program was contained in the Farwell Brain Fingerprinting 4.0 program. The Farwell Brain Fingerprinting 4.0 program also contained numerous additional, advanced features that were not implemented when Dr. Farwell's program was ported to the iCognative platform.

The iCognative analysis program is accessed on the Perform Analysis tab.[5]

The steps followed in the iCognative Perform Analysis are as follows. Again, all of these steps, features, algorithms, statistical and mathematical functions, results, data structures, variables, parameters, and displays (and many more) are also contained in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program .

1. Select the subject whose data are to be analyzed.
2. Select the tests (also known as "blocks") that are to be analyzed.
3. The following are some of the major parameters applied in the iCognative 2019 program. These are not user configurable in the iCognative 2019 program. These parameters will be named here, and discussed in detail below in the sections where they are applied. All of these parameters are also in the Brain Fingerprinting 2007 ****HERE****
    a. Analysis method (default: DCGM).
    b. Bootstrapping iterations (default: 1000)
    c. Analysis epoch start (default: 300 msec)
    d. Analysis epoch end (default: 1500 msec)
    e. Analysis channel (default: Pz)
    f. EEG range (default: 200 microvolts)
    g. EOG range (default: 200 microvolts)
    h. Minimum # of trials (default: 70)
    i. Information present criterion (default: 90%)
    j. Information absent criterion (default: 70%)

    User-configurable parameters *a. – j.* are included in the iCognative software. All of these are also included in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program . In addition, the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program has over 30 additional parameters that can be set by the user, with sliders on graphs in the GUI that can be used to set about a dozen of these.
4. Read from a storage medium all of the data for the subject and tests/blocks to be analyzed. These data comprise the subject's brainwave responses and manual (button-press) responses and the stimuli that elicited these responses on each trial, as well as the basic parameters applied in the data acquisition (or "capture") phase, the results of artifact-detection algorithms applied in data acquisition, and identifying information about the subject.
5. Select the data-analysis method. This is the mathematical algorithm that will be used to classify the subject's brain responses to Probe stimuli as being (a) more similar to the

[5] Between the Conduct Test tab and the Perform Analysis tab is the Replay Test tab. As described above, the "Replay" function is does not involve actual brainwave measurements. It is for the purpose of demonstrations. It comprises simply a repeat of the Conduct Test function, but instead of collecting real-time EEG data, it reads previously recorded data and displays them in the same manner as in an actual test. There is nothing of substance that is new or different on this tab, beyond what is on the Conduct Test tab.

Target responses, indicating that the subject knows the tested information, or (b) more similar to the Irrelevant responses, indicating that the subject does not know the tested information. These result respectively in an "Information Present" or "Information Absent" determination. If neither determination can be reached with a statistical confidence high enough to meet the criterion (*3. i.* or *j.* in the parameters listed above), the outcome is "Indeterminate."

The options are as follows.

a. Double-Centered-Grand-Mean (DCGM) Correlation. This is the default, and has been shown in research by Dr. Farwell and others to be the most accurate and reliable. This comprises computing the Pearson correlation (described below), after first subtracting the grand mean of all brain responses from the brain response for each individual trial. The Pearson and DCGM correlations are well known, standard statistical computations. They have both been disclosed in Dr. Farwell's scientific publications, beginning with Farwell and Donchin (1986, 1988a, 1991), in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program , in all of the patents referenced above, and extensively in the statistical literature.

b. Double-Centered-Unweighted-Mean (DCUW) Correlation. This is another variation on the double-centered correlation in which the respective mean brain responses to Target, Probe, and Irrelevant trials are computed first, and then the mean brain response of these three means is computed and subtracted from each individual trial's brain response waveform. Like the DCGM and the Pearson correlation, this has been disclosed in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program and extensively in the statistical literature.

c. Pearson Correlation. This is a common, well-known statistical technique, as discussed above for DCGM. It is implemented in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program .

d. Voting. This is simply a combination of the methods a, b, and c above.

e. Comparison CIT. This is a variation in which the Target brain responses are ignored, and the Probe and Irrelevant responses are compared. It has been shown (in Farwell 2012 and elsewhere) to result in 10 times higher error rate than DCGM as well as statistical confidences no better than chance for information-absent determinations. It is not a viable statistical technique, and does not meet the established Brain Fingerprinting Scientific Standards published in the scientific literature (e.g., Farwell 2012), nor does it meet the accuracy requirements for a technique to be used in the real world. Dr. Farwell selected it to be included his specifications for the iCognative software only for the sake of comparison to demonstrate the decrement in accuracy and statistical confidence brought about by failure to meet the Brain Fingerprinting Scientific Standards. It has been disclosed in many open-source publications in the scientific literature, including Farwell (2012) as well as many papers by other authors that are reviewed therein. It is in the public domain for reasons other than inclusion in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program .

In addition to the data-analysis methods from the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program that Dr. Farwell specified and Dr. Maison implemented in the iCognative 2019 program, the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program also included 17 additional data analysis methods, as follows: P300 Latency, P300 Latency (fitted), MERMER Latency, MERMER Latency (fitted), N2 Latency, P300 Amplitude, MERMER Amplitude, P300 - MERMER Amplitude, P3 - N2 Amplitude (peak-to-pre-peak), P300 Area, MERMER Area, Covariance, Total Absolute Deviation, Mean Absolute Deviation, RMS (vector distance), and P300 + MERMER Area.

6. Place the brainwave (ERP) and button-press data in arrays for Target, Probe, and Irrelevant trials.

7. Apply a digital filter to the brainwave data to eliminate noise in the data. The filter eliminates high-frequency noise that would otherwise interfere with the data analysis.

   The filter applied in the iCognative data analysis program is an optimal, equal-ripple, linear phase, low-pass, finite-impulse-response (FIR) filter. This same filter is contained in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program .

   Dr. Farwell and colleagues disclosed the digital filters used in the program in the scientific literature in Farwell et al. (1993), "Optimal Digital Filters for Long Latency Event-Related Brain Potentials." This scientific paper introduced optimal digital filters to the ERP scientific community, and these filters have now become standard in the field. The original program for designing the optimal, equal-ripple, linear phase, low-pass, finite-impulse-response (FIR) filters (PMFLTR.FOR) was written in Fortran by James H. McClellan at MIT, Thomas Parks at Rice University, and Lawrence Rabiner at Bell Laboratories, modified by Eric Romesburg of HAL Communications Corp., and further modified by Dr. Farwell in 1991. Dr. Farwell and Phil Goddard wrote a Fortran program (FILTER.FOR) to apply these filters to brainwave data though convolution in 1990. Dr. Farwell provided this to BWS LLC, and Dr. Maison translated this into C# for the iCognative software implementation of Dr. Farwell's invention. All of these are in the public domain.

   This same filter and essentially the same code are contained in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program .

8. Apply one or more artifact-detection algorithms, and mark the individual trials as either accepted or rejected[6]. This is a second method of eliminating noise in the data.

   a. The only artifact-detection algorithm applied by the iCognative 2019 program is the "range" computation. It is applied to the brainwave data in the EEG channel, and separately to the EOG (eye) channel. If the voltage range (highest minus lowest voltage in the appropriate time window of the ERP waveform) exceeds the allowable range, the trial is "rejected." Otherwise, it is "accepted." The maximum allowable respective ranges are specified by parameters *3. f.* and *g*.

[6] A note on terminology: The terms "accepted" and "good" are alternative terms for the same categories of brainwave responses, as are "rejected" and "bad," and "presented" and "total."

above. This is a common method in ERP research that has been in the public domain for decades.

This method is applied in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program and all other versions of the Farwell Brain Fingerprinting program since the original one developed in the early 1980s. It is disclosed in Farwell and Donchin (1986, 1988a, 1991) and expired US patents #4,941,477, #5,363,858, #5,406,956. It is also a common practice disclosed in thousands of other publications in the scientific literature. Farwell and Donchin (1988b) alone has been cited in over 3,000 subsequent scientific publications, most of which have applied this same algorithm. This same algorithm also appears in the scientific literature prior to any of Farwell's publications.

In addition to the "range" method, the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program applies 6 other, more advanced methods for detecting artifacts and eliminating noise in the data: Threshold, Variance, Slope, Instantaneous Slope, and Flatline.

9. The optimal digital filter and the range computation are the only two methods for eliminating noise in the data applied in the iCognative 2019 program. The range method is applied only in data analysis, and not in data acquisition. The range method is applied both places. Both of these methods are common and well known in the ERP scientific community. Both are applied in both data acquisition and data analysis in both the Farwell Brain Fingerprinting 4.0 Data Acquisition Program and the Farwell Brain Fingerprinting 4.0 Data Analysis Program, as well as many other public-domain sources. Both of the Farwell 2007 programs also apply several other, more advanced algorithms for eliminating noise in the data that are not applied in the iCognative 2019 program.

   In short, the iCognative 2019 program employs no methods for eliminating noise in the data that are original, unique, or different from what is applied in the Farwell 2007 programs and many other public-domain sources. On the other hand, the Farwell 2007 programs apply multiple other, more advanced methods for eliminating noise in the data that are not included in the iCognative 2019 program.

10. All Brain Fingerprinting tests, and all tests designed to replicate or imitate Dr. Farwell's original Brain Fingerprinting invention, including iCognative software, involve three types of stimuli: Targets, Probes, and Irrelevants. The Target stimuli contain information that the subject knows, that the scientist is sure the subject knows, and that is non-incriminating. An example would be information about the crime that the subject had been told after the crime, so he would know it whether he participated in the crime or not. The Probe stimuli contain information relevant to the crime that is known only to the perpetrator and investigators, and not to an innocent subject. The Irrelevant stimuli contain irrelevant information that is not relevant to the crime. The Irrelevant stimuli are designed to be equally plausible as the Probes as being crime-relevant, but are in fact unrelated to the crime.

    For example, a Probe stimulus might "pistol," if the crime was a murder and the pistol was the murder weapon. An Irrelevant stimulus might be "knife," as it is a plausible murder weapon, but is not in fact the murder weapon in this crime. A target stimulus might be the name of the victim, "John Jones," which would be known to the suspect

whether he committed the crime or not. The scientist makes sure that the Target stimuli are known to the suspect by telling him what the Target stimuli are before the test.

The subject's brain responses to the Targets provide a template for the subject's brain responses to known, relevant information. The subject's brain responses to the Irrelevants provide a template for the subject's brain responses to unknown, irrelevant information.

11. The next step in the iCognative 2019 program is to create and fill arrays for the brainwave data collected in response to Target, Probe, and Irrelevant stimuli respectively, using only the "accepted" trials, and excluding the "rejected" trials.

12. Then the average Target ERP brain response, the average Probe ERP brain response, and the average Irrelevant ERP brain response are computed. These averages are simple and common computations for ERPs and many other types of data.

13. The task of data analysis is to classify the subject's brain responses to Probe stimuli as being (a) more similar to the Target responses, indicating that the subject knows the tested information, or (b) more similar to the Irrelevant responses, indicating that the subject does not know the tested information. These result respectively in an "Information Present" or "Information Absent" determination. If neither determination can be reached with a statistical confidence high enough to meet the criterion, the outcome is "Indeterminate." In the course of computing the determination, the data analysis algorithm also computes a statistical confidence for this determination.

    The user sets (or uses the defaults for) the statistical confidence required for an Information Present determination (parameter *3. i.*) and for an Information Absent determination (parameter *3. j.*) If neither criterion is met, the outcome is "Indeterminate."

14. The computation of the determination and statistical confidence is accomplished using the statistical technique of bootstrapping. Bootstrapping is a statistical technique in the public domain that is well established in the statistical community and has become well known in the ERP scientific community.

    Farwell and Donchin (1988a, 1991) and their colleagues at the University of Illinois, Wasserman and Bockenholt (1988) introduced bootstrapping, a relatively new method at that time in the statistical world, to the field of psychophysiology. (Statisticians Wasserman and Bockenholt used Farwell and Donchin's application of bootstrapping in Farwell Brain Fingerprinting as an example of the correct use of the technique.) This technique has since become the standard in not only in Farwell Brain Fingerprinting but also in all other brainwave applications for detection of concealed information.

    The steps in the bootstrapping technique as applied in Farwell Brain Fingerprinting are described in detail in Farwell and Donchin (1991), Farwell (2012), Wasserman and Bockenholt (1988), and several other of Dr. Farwell's scientific papers. These are in the public domain. The iCognative software uses the exact same method and algorithms.

15. If the result of the bootstrapping algorithm meets the criterion for "Information Present," the subject is determined to be "Information Present"; meaning that he knows the relevant information tested. If the result of the bootstrapping algorithm meets the criterion for "Information Absent," the subject is determined to be "Information Absent";

meaning that he does not know the relevant information tested. If neither criterion is met, there is no determination, and the outcome is "Indeterminate." If the subject is determined to be either "Information Present" or "Information Absent," the bootstrapping procedure also provides a statistical confidence for this result. This is the computed probability that the determination is correct, in light of the magnitude of the effect detected and the variability in the data. This is explained in detail in Farwell and Donchin (1991), Farwell (2012), and US patents #4,941,477, and #5,363,858, and elsewhere in the public domain in writings of Dr. Farwell and others.

16. Next the iCognative computes the reaction time and accuracy results. These are computed on all trials, not only the "accepted" trials. These computations are identical to the same computations applied in the data acquisition ("capture") phase, and in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement and Brainwave Analysis programs. Such reaction-time and accuracy computations are common not only in Farwell Brain Fingerprinting and the various replications and imitations of Dr. Farwell's invention, but widely in psychophysiological and psychological research.

17. The iCognative 2019 program then displays the results.

18. The brainwave results are displayed in a plot that is virtually identical to the average brainwave display in the iCognative data acquisition phase and to the corresponding display in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement program, both of which are illustrated above. The Farwell Brain Fingerprinting 4.0 Brainwave Analysis program also has a virtually identical display for the brainwave responses.

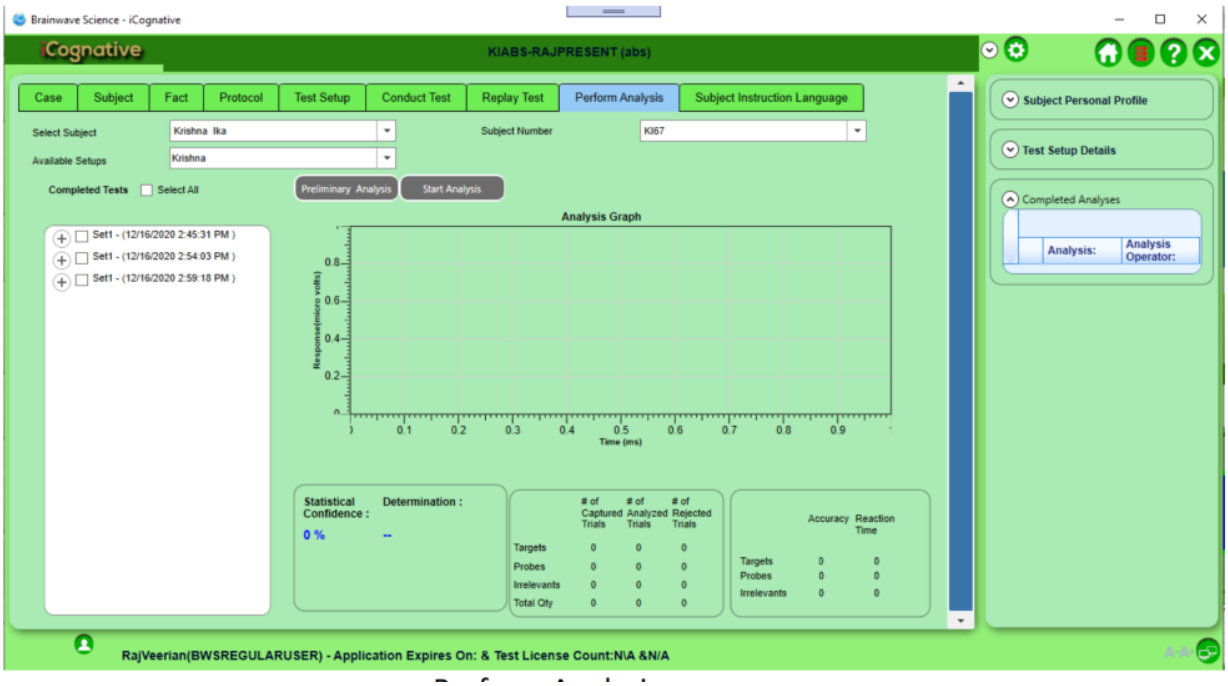
19. The iCognative 2019 program displays the determination and statistical confidence on a single line, as there is only one method applied for the analysis at a time. (Additional analyses with a different analysis algorithm require the program to be run again with a different analysis method selected.)

    The Farwell Brain Fingerprinting 4.0 Data Analysis Program computes and displays 21 the results of 21 different analysis methods, and displays more extensive information about each method in addition to the determination and statistical confidence. The iCognative 2019 program computes and displays a small subset of what is computed and displayed by the Farwell Brain Fingerprinting 4.0 Brainwave Analysis Program. Everything computed and displayed by the iCognative 2019 program is also computed and displayed by the Farwell Brain Fingerprinting 4.0 Data Analysis Program; however, the latter computes and displays extensive additional information for this reason, the results in the Farwell Brain Fingerprinting 4.0 Brainwave Analysis Program occupy not a single line on the display screen, but an extensive table. In short, the iCognative display of the determination and statistical confidence comprises a small part of the more extensive table displayed by the Farwell Brain Fingerprinting 4.0 Brainwave Analysis Program.

20. The iCognative 2019 program displays the numbers of Target, Probe, and Irrelevant trials "captured" (all trials submitted for analysis), "Analyzed" ("good" or "accepted" trials, free from artifacts as per the artifact-detection algorithm), and "rejected" (rejected by the artifact-detection algorithm and not analyzed.

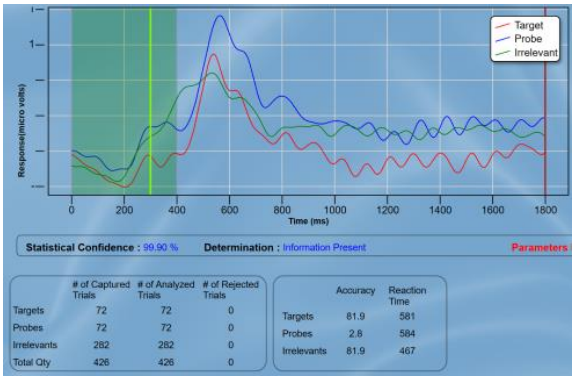
21. The iCognative 2019 program displays the button-press reaction-time (RT) and accuracy results in a table that is very similar to the tables for the data acquisition ("capture") phase of the iCognative 2019 program and the Farwell Brain Fingerprinting 4.0 Brainwave Measurement program discussed and illustrated above. The Farwell Brain Fingerprinting 4.0 Brainwave Analysis program has a more extensive table, because it computes several additional results that iCognative lacks. As with the determination and statistical confidence, the iCognative computations and displays are a subset of those of the Farwell Brain Fingerprinting 4.0 Brainwave Analysis program.

22. The following graphics illustrate the displays of the iCognative 2019 program data-analysis phase and the Farwell Brain Fingerprinting 4.0 Brainwave Analysis program.



Data Analysis tab screen from BWS Inc.'s Complaint

This mock-up is approximately what the iCognative results panel looks like after the analysis.



Mock-up of iCognative results panel showing analysis results

In the above screen provided by BWS Inc. as an illustration of its iCognative 2019 program, the data analysis has not yet been run. After it is run, the Analysis Graph will have the same information as in the graph for the ERP averages in the data acquisition phase illustrated above, in essentially the same format – red line for Targets, blue line for Probes, green line for Irrelevants.

The Statistical Confidence (e.g., 99%) and Determination (e.g., "Information Present") fields will be populated.

The table for trial counts is also essentially the same as the corresponding table in the Data Acquisition ("capture") phase of the iCognative 2019 program and the (except without the "required" trial counts, which are irrelevant for data analysis). "Captured trials" are all (or "Total") trials presented in the test, "Analyzed Trials" are all artifact-free or "Good" trials, and "Rejected Trials" or "Bad" trials are those determined to have an artifact.

The Accuracy and Reaction Time table is also essentially the same as the corresponding table in the Data Acquisition phase of the iCognative 2019 program.

The "Statistical Confidence" fields are the only ones of the above features in the Data Analysis phase of the iCognative 2019 program that are not contained, in essentially the same format, in the Data Acquisition screen of the iCognative program.

All of the above are also contained, in essentially the same format, in the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program. All of the data contained in these displays, and the mode of displaying these data in graphs and tables, are in the public domain. Similar data and displays appear in all or virtually all of the programs by many different scientists and others developed to replicate Dr. Farwell's initial Brain Fingerprinting program developed in 1985.

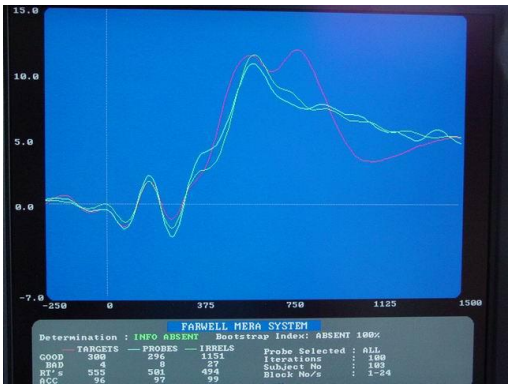
Essentially the same brainwave plots are contained in the Farwell Brain Fingerprinting 4.0 Brainwave Analysis program. This program also contains all the same data with respect to trial counts and reaction time/accuracy tables. However, the format is different, because the Farwell 2007 program conducts many additional analyses and has many additional user-configurable parameters than the iCognative 2019 program. When Dr. Farwell provided BWS LLC/Inc. with the specifications that became the iCognative program, he included only a small subset of the functionality and corresponding displays of the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program .

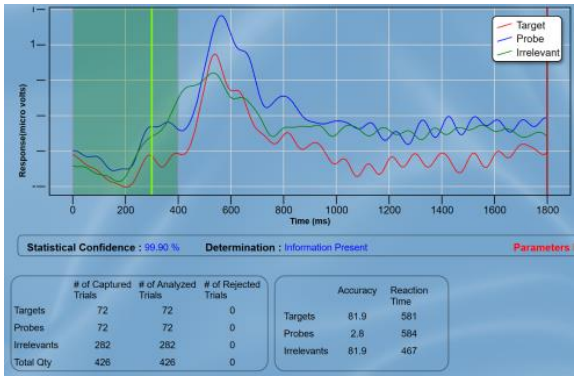
The Farwell MERA System 1993 Data Analysis Program

The Farwell MERA System 1993 Data Analysis Program also conducted the same analysis and displayed all the same data as the iCognative 2019 Program.

The display of the public-domain Farwell 1993 Data Analysis Program, however, is useful in identifying what is in the public domain and what pre-existed the iCognative 2019 Program. When Dr. Farwell provided BWS LLC/Inc. with the specs for the iCognative 2019 Program, he used the same specs for the data display (as well as the analysis) as he used for the waveform Farwell 1993 Data Analysis Program. The data displayed and the brainwave and table displays of the Farwell 1993 Program and the iCognative 2019 Program are virtually identical, except for minor differences in nomenclature and a few cosmetic considerations such as the color of the background.

Compare the below screenshot of the Farwell MERA 1993 Data Analysis Program results screen with the mockup of the iCognative 2019 Program (identical to the iCognative 2019 screen provided by BWS Inc., but with the brainwave display and data fields populated as they are after analysis is completed).





Farwell 1993 Program iCognative 2019 Program

The last tab on the iCognative program is the Subject Instruction Language tab. This provides the standard open-source fonts available under Windows for displaying the text stimuli and instructions in other languages.

Additional Functions on the Home Page

The home page of the iCognative program presents several additional features. Help ("?") provides a link to documentation on use of the program. Exit ("X") terminates the program. Settings (gear icon) presents a drop-down list with the following options. "Image editor" provides a link to open-source tools for editing images. "Language Settings" allows the user to select which open-source fonts to use. Aside from being open-source, this does not involve any of the protocols, functions, or algorithms involved in brainwave data acquisition and analysis. "Technical Support" provides a link to support documentation. "About" displays a text box with information about the program. All of these are standard, obvious, and common features of many software programs of various kinds.

Headset Configuration

"Headset Configuration" navigates to the "Headset Configuration" screen. This is the only feature of the iCognative 2019 program that is not in the public domain, and the only feature that is not derived from the pre-existing public-domain Farwell programs. The headset used by the iCognative 2019 Program and the digital signal processor and amplifiers embedded therein are different from the corresponding features of the Farwell programs and most other programs. Consequently, the software for communicating with the headset may be unique to the iCognative Program, and is at least different from that of the Farwell programs. It is possible that the iCognative software for communicating with the headset may be proprietary and may contain trade secrets. Since none of this software is at all similar to the corresponding software in the Farwell systems, which is designed to communicate with entirely different hardware, this consideration is not relevant to the present comparison. Whether or not the iCognative 2019 Program contains proprietary information or trade secrets involving communicating with the headset is irrelevant to this comparison, because the corresponding sections of the Farwell software are totally different.

Summary: Protocols, Algorithms, Data, Computations, Results, and Displays

The above constitutes a summary of the scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed. If the analysis determines that the above account is factual, and the respective programs are as documented herein, then the inevitable conclusion is that with respect to the above features, all of the iCognative 2107 Program is public domain and open source, and everything of substance in the iCognative 2019 Program was also contained in the pre-existing Farwell programs, with the sole following exception. The software for communicating with the headset and embedded signal processor and amplifiers in the iCognative Program is different from that of the Farwell Programs, because the corresponding hardware implementations are different. Nothing in the part of the iCognative Program that is not public domain is also contained in any of the Farwell Programs.

Open-Source Software Tools Used in the iCognative 2019 Program

The above scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the handling of the data collected, displayed, stored, and analyzed, were implemented using open-source and public-domain software tools that are common in the industry. These include the following.

1) The Software components are written in Microsoft C# programing language. C# (pronounced See-Sharp) is a popular and modern programming language created by Microsoft in 2000 alongside their .NET framework. They wanted a more flexible language to build a variety of secure and robust modern applications for Windows, web servers, tablets, and phones. It is now arguably one of the most valuable programming languages in the world to know. C# is an open-source programming language. https://dotnet.microsoft.com/languages/csharp
2) Aside from the language itself, the building blocks of the application use the Microsoft .NET framework (pronounced as "dot net"). .NET framework is a free software developer open-source platform for building software applications. https://dotnet.microsoft.com/

3) The software application uses two different Graphical User Interface (GUI). The GUI is what dictates how the application will look on the computer screen.
We use Microsoft WinForms and Microsoft Windows Presentation Framework (WPF) both in the public domain and open software.
https://en.wikipedia.org/wiki/Windows_Forms
https://github.com/dotnet/wpf

4) To facilitate and speed up the development we used additional software components to create graphs and display data in tables. The Graphical display software (Interactive Data Display created by Dmitry Voitsekhovskiy and Mikhail.) is open software and freely downloadable on the GitHub repository.
https://www.microsoft.com/en-us/research/project/interactive-data-display/
https://github.com/predictionmachines/InteractiveDataDisplay and
https://github.com/microsoft/InteractiveDataDisplay.WPF

5) The data table package is based on the Extended DataGrid open source project as mentioned in https://www.findbestopensource.com/tagged/datagrid?fq=Ms-PL
the project was so successful that it's now incorporated into Microsoft's open-source framework.
https://github.com/dotnet/DataGridExtensions

6) The internal data format for storing data uses the eXtended Markup Language (XML) as denied in open standard
https://www.w3.org/XML/
https://en.wikipedia.org/wiki/XML

7) Microsoft provides free of charge the necessary tools to create software for Windows or other platforms. We used Microsoft Visual Studio.
https://visualstudio.microsoft.com/vs/community/

Open-Source Software Tools Used in the Farwell Programs

The Farwell Programs used different open-source software tools to implement the same algorithms and protocols as those in the iCognative Program. These include the DOS operating system, C and C++ languages, and Metagraphics MetaWINDOW for the Farwell Brain Fingerprinting 4.0 Brainwave Measurement Program and the Farwell MERA 1993 Data Analysis Program, Fortran running under DOS for the programs for generating applying the optimal digital filters applied therein, and IDL for the Farwell Brain Fingerprinting IDL Data Analysis Program.

Summary: Open-Source Software Tools

The iCognative Software implemented the above described scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed, using open-source software tools and programs that are readily and freely available.

The Farwell programs used different open-source tools, along with extensive custom code, to implement the same.

Overall Summary

It is the task of the software testing to determine whether the above account is factual and the respective programs are as documented herein. If the analysis determines that the above account is factual, and the respective programs are as documented herein, then the inevitable conclusions to be included in the report are as follows:

1. With respect to the above-described scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed, all of the iCognative 2107 Program is public domain and open source, except for the one exception noted below.
2. With respect to the above features, everything of substance in the iCognative 2019 Program was also contained in the pre-existing, public-domain Farwell programs, with the sole exception noted below.
3. The iCognative 2019 Program also contained other, non-brainwave-related, non-scientific, non-proprietary features such as entering and displaying subject demographic information. These are common, public-domain features. These features are not involved in the brainwave measurements or data analysis. These features in the iCognative 2019 Program are not contained, or are implemented differently, in the Farwell programs.
4. All of the following features in the BWS software were provided to BWS by Dr. Farwell based on his pre-existing public-domain software and publications, and are in the public domain. All of these features are in both the iCognative software and the pre-existing Farwell software:
    a) prompting testing personnel for appropriate stimuli;
    b) displaying stimuli to testing subjects in optimal order and at optimal intervals;
    c) capturing appropriate P300 brainwave responses;
    d) disregarding and/or eliminating extraneous responses and other "noise" which may interfere with the accuracy of the testing;
    e) being highly resistant to any attempted countermeasures;
    f) performing appropriate analysis of P300 measured responses utilizing state-of-the-art statistical, mathematical, and IT algorithms;
    g) generating the data for objective reports for use by examiners, investigating agencies and legal authorities.
5. The iCognative 2019 Program implemented the above protocols, algorithms, and features making extensive use of open-source software.
6. The Farwell programs implemented the same, using different open-source software along with extensive custom code.
7. Only one part of the iCognative 2019 Program was not open source or public domain. The software for communicating with the headset and embedded signal processor and amplifiers in the iCognative Program is different from that of the Farwell Programs, because the corresponding hardware implementations are different. This part of the iCognative 2019 Program is also different from many other applications, may be unique,

and may contain proprietary information. This was not contained in the pre-existing Farwell Programs.

8. Nothing in the only part of the iCognative Program that is not public domain is also contained in any of the Farwell Programs.
9. With respect to scientific protocols, experimental design, algorithms, mathematics, statistics, parameters, methods, and procedures, as well as the data collected, displayed, stored, and analyzed, everything of substance in both the Farwell Programs and the iCognative 2019 Program is in the public domain.
10. The implementation of these public domain features in the Farwell Programs is completely different, with respect to the actual code, from the iCognative code. A line-by-line comparison will show that every line, or virtually every line, in the code is different. Thus, the pre-existing Farwell Programs do not contain any part of the iCognative Software submitted to Codequiry.
11. Because the Farwell Programs existed long before the iCognative 2019 Program was implemented or even conceived (or BWS LLC/Inc. even existed), it would be logically impossible for the Farwell Programs to contain any part of the iCognative Program submitted to Codequiry.

References

1. Farwell, L.A.., Richardson, D.C., & Richardson, G.M. (2013). Brain fingerprinting field studies comparing P300-MERMER and P300 brainwave responses in the detection of concealed information. DOI 10.1007/s11571-012-9230-0, *Cognitive Neurodynamics 7*(4): 263-299 (PDF); Cognitive Neurodynamics website

Farwell, L.A.., Richardson, D.C., & Richardson, G.M. (2013). Brain fingerprinting field studies comparing P300-MERMER and P300 brainwave responses in the detection of concealed information. DOI 10.1007/s11571-012-9230-0, *Cognitive Neurodynamics 7*(4): 263-299

https://larryfarwell.com/pdf/Dr-Lawrence-Farwell-Brain-Fingerprinting-Field-Studies-Comparing-P300-MERMER-and-P300-in-the-Detection-of-Concealed-Information-Dr-Larry-Farwell.pdf

https://link.springer.com/article/10.1007/s11571-012-9230-0 [full text]

2. Farwell L.A., Richardson D.C., Richardson G.M .and Furedy J.J. (2014). Brain fingerprinting classification concealed information test detects US Navy military medical information with P300. Front. Neurosci. 8:410. doi: 10.3389/fnins.2014.00410

Farwell L.A., Richardson D.C., Richardson G.M .and Furedy J.J. (2014). Brain fingerprinting classification concealed information test detects US Navy military medical information with P300. *Frontiers in Neuroscience 8*:410. doi: 10.3389/fnins.2014.00410

https://www.frontiersin.org/articles/10.3389/fnins.2014.00410/full [full text]

3. Farwell, L. (2014). Brain Fingerprinting: Detection of Concealed Information, in Wiley Encyclopedia of Forensic Science, A. Jamieson and A.A. Moenssens, eds. Chichester: John

Wiley. DOI: 10.1002/9780470061589.fsa1013. Published 16th June 2014 (PDF). Wiley Online Library

Farwell, L. (2014). Brain Fingerprinting: Detection of Concealed Information, in *Wiley Encyclopedia of Forensic Science*, A. Jamieson and A.A. Moenssens, eds. Chichester: John Wiley. DOI: 10.1002/9780470061589.fsa1013. Published 16th June 2014 (PDF).

https://larryfarwell.com/pdf/Dr-Lawrence-Farwell-Brain-Fingerprinting-Detection-of-Concealed-Information-Wiley-Encyclopedia-of-Forensic-Science-Dr-Larry-Farwell.pdf

https://onlinelibrary.wiley.com/doi/book/10.1002/9780470061589 [reference to entire book, not this article]

4. Farwell, L.A. (2012). Brain fingerprinting: a comprehensive tutorial review of detection of concealed information with event-related brain potentials, Cognitive Neurodynamics 6:115-154, DOI 10.1007/s11571-012-9192-2.

Farwell, L.A. (2012). Brain fingerprinting: a comprehensive tutorial review of detection of concealed information with event-related brain potentials, *Cognitive Neurodynamics 6*:115-154, DOI 10.1007/s11571-012-9192-2. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3311838/

5. Farwell, L. A. and Smith, S. S. (2001). Using Brain MERMER Testing to Detect Concealed Knowledge Despite Efforts to Conceal. Journal of Forensic Sciences 46,1: 135-143.

Farwell, L. A. and Smith, S. S. (2001). Using Brain MERMER Testing to Detect Concealed Knowledge Despite Efforts to Conceal. Journal of Forensic Sciences 46,1: 135-143. Available at: https://larryfarwell.com/pdf/Farwell-Smith-Journal-of-Forensic-Sciences-Brain-Fingerprinting-P300-MERMER-dr-larry-farwell-dr-lawrence-farwell.pdf https://www.researchgate.net/publication/12120255_Using_Brain_MERMER_Testing_to_Detect_Knowledge_Despite_Efforts_to_Conceal [full text]

6. Farwell, L.A. and Makeig, T.H. (2005), Farwell Brain Fingerprinting in the case of Harrington v. State. Open Court, X [10]:3, 7-10. Indiana State Bar Association, September 2005.

Farwell, L.A. and Makeig, T.H. (2005), Farwell Brain Fingerprinting in the case of Harrington v. State. Open Court, X [10]:3, 7-10. Indiana State Bar Association, September 2005.

https://larryfarwell.com/pdf/OpenCourtFarwellMakeig-dr-larry-farwell-brain-fingerprinting-dr-lawrence-farwell.pdf

7. Farwell, L. A. and Donchin, E. (1991). The Truth Will Out: Interrogative Polygraphy ("Lie Detection") With Event-Related Brain Potentials. Psychophysiology, 28:531-547.

Farwell, L. A. and Donchin, E. (1991). The Truth Will Out: Interrogative Polygraphy ("Lie Detection") With Event-Related Brain Potentials. Psychophysiology, 28:531-547.

https://larryfarwell.com/pdf/Farwell-Donchin-1991-Psychophysiology-Brain-Fingerprinting-the-Truth-Will-Out-dr-larry-farwell-dr-lawrence-farwell.pdf

https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1469-8986.1991.tb01990.x [Psychophysiology abstract only]

8. Farwell, L.A. (2013). Lie Detection. In Encyclopedia of Forensic Sciences, 2nd Edition. Oxford: Elsevier.

https://www.sciencedirect.com/science/article/pii/B9780123821652000258#a0010 [abstract + bio.]

9. Farwell, L. A. and Donchin, E. (1988). Talking Off The Top Of Your Head: A Mental Prosthesis Utilizing Event-Related Brain Potentials. Electroencephalography and Clinical Neurophysiology, 70: 510-513.

Farwell, L. A. and Donchin, E. (1988). Talking Off The Top Of Your Head: A Mental Prosthesis Utilizing Event-Related Brain Potentials. *Electroencephalography and Clinical Neurophysiology, 70*: 510-513.

http://www.larryfarwell.com/pdf/Farwell-Donchin-1988-Talking-Off-the-Top-of-Your-Head-BCI-brain-computer-interface.pdf

https://www.sciencedirect.com/science/article/abs/pii/0013469488901496?via%3Dihub [abstract only]

file: Farwell-Donchin-1988-Talking-Off-the-Top-of-Your-Head-BCI-brain-computer-interface.pdf

10. Allen J, Iacono WG (1997) A comparison of methods for the analysis of event-related potentials in deception detection. *Psychophysiology 34*:234–240